

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

United States Patent and Trademark
Office
(Box PCT)
Crystal Plaza 2
Washington, DC 20231
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year)

21 June 1999 (21.06.99)

International application No.

PCT/EP98/07571

Applicant's or agent's file reference

Bw 19752056

International filing date (day/month/year)

24 November 1998 (24.11.98)

Priority date (day/month/year)

25 November 1997 (25.11.97)

Applicant

KUENZNER, Hermann et al

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

14 May 1999 (14.05.99)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

F. Baechler

Telephone No.: (41-22) 338.83.38

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VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT
AUF DEM GEBIET DES PATENTWESENS

PCT

INTERNATIONALER RECHERCHENBERICHT

(Artikel 18 sowie Regeln 43 und 44 PCT)

Aktenzeichen des Anmelders oder Anwalts Bw 19752056	WEITERES VORGEHEN siehe Mitteilung über die Übermittlung des internationalen Recherchenberichts (Formblatt PCT/ISA/220) sowie, soweit zutreffend, nachstehender Punkt 5	
Internationales Aktenzeichen PCT/EP 98/ 07571	Internationales Anmeldedatum (Tag/Monat/Jahr) 24/11/1998	(Frühestes) Prioritätsdatum (Tag/Monat/Jahr) 25/11/1997
Anmelder BAYERISCHE MOTOREN WERKE AKTIENGESELLSCHAFT et al.		

Dieser internationale Recherchenbericht wurde von der Internationalen Recherchenbehörde erstellt und wird dem Anmelder gemäß Artikel 18 übermittelt. Eine Kopie wird dem Internationalen Büro übermittelt.

Dieser internationale Recherchenbericht umfaßt insgesamt 4 Blätter.



Darüber hinaus liegt ihm jeweils eine Kopie der in diesem Bericht genannten Unterlagen zum Stand der Technik bei.

1. Grundlage des Berichts

- a. Hinsichtlich der **Sprache** ist die internationale Recherche auf der Grundlage der internationalen Anmeldung in der Sprache durchgeführt worden, in der sie eingereicht wurde, sofern unter diesem Punkt nichts anderes angegeben ist.



Die internationale Recherche ist auf der Grundlage einer bei der Behörde eingereichten Übersetzung der internationalen Anmeldung (Regel 23.1 b)) durchgeführt worden.

- b. Hinsichtlich der in der internationalen Anmeldung offenbarten **Nucleotid- und/oder Aminosäuresequenz** ist die internationale Recherche auf der Grundlage des Sequenzprotokolls durchgeführt worden, das



in der internationalen Anmeldung in Schriftlicher Form enthalten ist.



zusammen mit der internationalen Anmeldung in computerlesbarer Form eingereicht worden ist.



bei der Behörde nachträglich in schriftlicher Form eingereicht worden ist.



bei der Behörde nachträglich in computerlesbarer Form eingereicht worden ist.



Die Erklärung, daß das nachträglich eingereichte schriftliche Sequenzprotokoll nicht über den Offenbarungsgehalt der internationalen Anmeldung im Anmeldezeitpunkt hinausgeht, wurde vorgelegt.



Die Erklärung, daß die in computerlesbarer Form erfaßten Informationen dem schriftlichen Sequenzprotokoll entsprechen, wurde vorgelegt.

2.



Bestimmte Ansprüche haben sich als nicht recherchierbar erwiesen (siehe Feld I).

3.



Mangelnde Einheitlichkeit der Erfindung (siehe Feld II).

4. Hinsichtlich der **Bezeichnung der Erfindung**



wird der vom Anmelder eingereichte Wortlaut genehmigt.



wurde der Wortlaut von der Behörde wie folgt festgesetzt:

5. Hinsichtlich der **Zusammenfassung**



wird der vom Anmelder eingereichte Wortlaut genehmigt.



wurde der Wortlaut nach Regel 38.2b) in der in Feld III angegebenen Fassung von der Behörde festgesetzt. Der Anmelder kann der Behörde innerhalb eines Monats nach dem Datum der Absendung dieses internationalen Recherchenberichts eine Stellungnahme vorlegen.

6. Folgende Abbildung der **Zeichnungen** ist mit der Zusammenfassung zu veröffentlichen: Abb. Nr. 1



wie vom Anmelder vorgeschlagen



keine der Abb.



weil der Anmelder selbst keine Abbildung vorgeschlagen hat.



weil diese Abbildung die Erfindung besser kennzeichnet.

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Feld III

WORTLAUT DER ZUSAMMENFASSUNG (Fortsetzung von Punkt 5 auf Blatt 1)

Die Zusammenfassung wird wie folgt geändert:

Zeile 8: nach "Randbereich" ist "(2)" einzufügen;

Zeile 12: nach "Mittelbereich" ist "(3)" einzufügen.

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A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
 IPK 6 G06F3/033

Nach der Internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK

B. RECHERCHIERTE GEBIETE

 Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
 IPK 6 G06F

Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie ^o	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
Y	EP 0 796 766 A (PHILIPS PATENTVERWALTUNG ;PHILIPS ELECTRONICS NV (NL)) 24. September 1997 in der Anmeldung erwähnt	1
A	siehe das ganze Dokument ---	2-6
Y	WO 96 30822 A (FOREST DONALD K) 3. Oktober 1996	1
A	siehe Seite 42, Zeile 18 - Zeile 34 siehe Seite 86, Zeile 15 - Zeile 25 siehe Abbildung 19 siehe Abbildungen 52,53,64,65 ---	7
A	US 4 794 388 A (MATTHEWS HENRY G) 27. Dezember 1988 siehe Spalte 11, Zeile 45 - Spalte 12, Zeile 37; Ansprüche 1-3; Abbildungen 1,4 ---	1-6
	--- -/--	

☒ Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen

☒ Siehe Anhang Patentfamilie

^o Besondere Kategorien von angegebenen Veröffentlichungen :

"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist

"E" älteres Dokument, das jedoch erst am oder nach dem internationalen Anmeldedatum veröffentlicht worden ist

"L" Veröffentlichung, die geeignet ist, einen Prioritätsanspruch zweifelhaft erscheinen zu lassen, oder durch die das Veröffentlichungsdatum einer anderen im Recherchenbericht genannten Veröffentlichung belegt werden soll oder die aus einem anderen besonderen Grund angegeben ist (wie ausgeführt)

"O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung, eine Ausstellung oder andere Maßnahmen bezieht

"P" Veröffentlichung, die vor dem internationalen Anmeldedatum, aber nach dem beanspruchten Prioritätsdatum veröffentlicht worden ist

"T" Spätere Veröffentlichung, die nach dem internationalen Anmeldedatum oder dem Prioritätsdatum veröffentlicht worden ist und mit der Anmeldung nicht kollidiert, sondern nur zum Verständnis des der Erfindung zugrundeliegenden Prinzips oder der ihr zugrundeliegenden Theorie angegeben ist

"X" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann allein aufgrund dieser Veröffentlichung nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden

"Y" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist

"Z" Veröffentlichung, die Mitglied derselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche

30. März 1999

Absendedatum des internationalen Recherchenberichts

08/04/1999

 Name und Postanschrift der Internationalen Recherchenbehörde
 Europäisches Patentamt, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Bevollmächtigter Bediensteter

Durand, J

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C.(Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie°	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	EP 0 498 082 A (KONINKL PHILIPS ELECTRONICS NV) 12. August 1992 siehe Spalte 6, Zeile 22 - Zeile 35; Abbildungen 3,7 ---	1,7
A	US 5 297 253 A (MEISEL LESLIE M) 22. März 1994 siehe Spalte 7, Zeile 9 - Zeile 37; Abbildungen ---	1
A	PATENT ABSTRACTS OF JAPAN vol. 097, no. 009, 30. September 1997 & JP 09 114902 A (HITACHI LTD; HITACHI SEIBU SOFTWARE LTD), 2. Mai 1997 siehe Zusammenfassung ---	1
A	"ALGORITHM FOR DECREASING THE ERROR RATE OF DATA ENTERED ON A TOUCH-SENSITIVE TERMINAL" IBM TECHNICAL DISCLOSURE BULLETIN, Bd. 33, Nr. 10A, 1. März 1991, Seiten 223-227, XP000110024 siehe Seite 224 ---	7
A	EP 0 623 870 A (IBM) 9. November 1994 siehe das ganze Dokument ---	8
A	EP 0 366 132 A (BAYERISCHE MOTOREN WERKE AG) 2. Mai 1990 in der Anmeldung erwähnt siehe das ganze Dokument -----	1,7

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 98/07571

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0796766	A	24-09-1997	DE 19610344 A	25-09-1997
			JP 10020950 A	23-01-1998
			US 5883346 A	16-03-1999
WO 9630822	A	03-10-1996	AU 2191095 A	16-10-1996
			DE 19581933 T	16-04-1998
			GB 2314186 A	17-12-1997
US 4794388	A	27-12-1988	NONE	
EP 0498082	A	12-08-1992	DE 69129364 D	10-06-1998
			DE 69129364 T	22-10-1998
			JP 4317119 A	09-11-1992
			US 5828360 A	27-10-1998
US 5297253	A	22-03-1994	NONE	
EP 0623870	A	09-11-1994	CA 2095452 A	05-11-1994
			JP 6332648 A	02-12-1994
			US 5559945 A	24-09-1996
			US 5689668 A	18-11-1997
EP 0366132	A	02-05-1990	DE 3836555 A	10-05-1990
			DE 4001062 A	18-07-1991
			DE 58908735 D	19-01-1995
			ES 2064418 T	01-02-1995
			JP 2187814 A	24-07-1990
			JP 2840332 B	24-12-1998
			US 5270689 A	14-12-1993



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Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

3

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09/555144

Applicant's or agent's file reference Bw 19752056	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP98/07571	International filing date (day/month/year) 24 November 1998 (24.11.98)	Priority date (day/month/year) 25 November 1997 (25.11.97)
International Patent Classification (IPC) or national classification and IPC G06F 3/033		
Applicant BAYERISCHE MOTOREN WERKE AKTIENGESELLSCHAFT		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet. <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of _____ sheets.
3. This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input checked="" type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 14 May 1999 (14.05.99)	Date of completion of this report 17 January 2000 (17.01.2000)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP98/07571

I. Basis of the report

1. This report has been drawn on the basis of (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

- ☐ the international application as originally filed.
- ☒ the description, pages 1-6, as originally filed,
 pages _____, filed with the demand,
 pages _____, filed with the letter of _____,
 pages _____, filed with the letter of _____.
- ☒ the claims, Nos. 1-8, as originally filed,
 Nos. _____, as amended under Article 19,
 Nos. _____, filed with the demand,
 Nos. _____, filed with the letter of _____,
 Nos. _____, filed with the letter of _____.
- ☒ the drawings, sheets/fig 1/3-3/3, as originally filed,
 sheets/fig _____, filed with the demand,
 sheets/fig _____, filed with the letter of _____,
 sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP 98/07571

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	1-8	YES
	Claims		NO
Inventive step (IS)	Claims	1-8	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-8	YES
	Claims		NO

2. Citations and explanations

Reference is made to the following documents:

D1: EP-A-0 796 766 (PHILIPS PATENTVERWALTUNG; PHILIPS ELECTRONICS NV (NL)), 24 September 1997, mentioned in the application

D2: WO 96 30822 A (FOREST DONALD K), 3 October 1996

1 The invention concerns a device for controlling a display screen with an actuating member.

2 Document D1 discloses a device such as this. The actuating member serves to increase the number of levels within the menu structure. To this effect, it is stated that the levels should be distributed over the extent of the display screen.

A device such as this adds an additional complication for the user, since there is no clear co-ordination between the additional movement and the axial or rotational movement of the actuating member. The transition between the levels and within the menu structure is not clear and this leads ultimately to the driver being considerably distracted from what is happening on the road.

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- 3 The essential difference of the invention with respect to the prior art is that there is a clear co-ordination between the display screen and the different possibilities for moving the actuating member.

The additional movement of the actuating member causes a superior point of the menu structure to be selected, and the rotational or lengthwise movement of the actuating member causes a subordinate point of the menu structure to be selected. The possible menus are arranged in the edge area, whilst the corresponding sub-menus, functions or function values are located in the middle area.

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/EP 98/07571

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

The features of the preamble of the claims have not been provided with reference signs placed between parentheses (PCT Rule 6.2(b)).

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VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS

PCT

REC'D 19 JAN 2000

INTERNATIONALER VORLÄUFIGER PRÜFUNGSBERICHT

(Artikel 36 und Regel 70 PCT)


Aktenzeichen des Anmelders oder Anwalts AJ-33/Bw/dr/PA 1975	WEITERES VORGEHEN siehe Mitteilung über die Übersendung des internationalen vorläufigen Prüfungsbericht (Formblatt PCT/IPEA/416)	
Internationales Aktenzeichen PCT/EP98/07571	Internationales Anmeldedatum (Tag/Monat/Jahr) 24/11/1998	Prioritätsdatum (Tag/Monat/Tag) 25/11/1997
Internationale Patentklassifikation (IPK) oder nationale Klassifikation und IPK G06F3/033		
Anmelder BAYERISCHE MOTOREN WERKE AKTIENGESELLSCHAFT et al.		

- Dieser internationale vorläufige Prüfungsbericht wurde von der mit der internationale vorläufigen Prüfung beauftragte Behörde erstellt und wird dem Anmelder gemäß Artikel 36 übermittelt.
- Dieser BERICHT umfaßt insgesamt 5 Blätter einschließlich dieses Deckblatts.
 - ☐ Außerdem liegen dem Bericht ANLAGEN bei; dabei handelt es sich um Blätter mit Beschreibungen, Ansprüchen und/oder Zeichnungen, die geändert wurden und diesem Bericht zugrunde liegen, und/oder Blätter mit vor dieser Behörde vorgenommenen Berichtigungen (siehe Regel 70.16 und Abschnitt 607 der Verwaltungsrichtlinien zum PCT).

Diese Anlagen umfassen insgesamt Blätter.

3. Dieser Bericht enthält Angaben zu folgenden Punkten:

- I ☒ Grundlage des Berichts
- II ☐ Priorität
- III ☐ Keine Erstellung eines Gutachtens über Neuheit, erfinderische Tätigkeit und gewerbliche Anwendbarkeit
- IV ☐ Mangelnde Einheitlichkeit der Erfindung
- V ☒ Begründete Feststellung nach Artikel 35(2) hinsichtlich der Neuheit, der erfinderische Tätigkeit und der gewerbliche Anwendbarkeit; Unterlagen und Erklärungen zur Stützung dieser Feststellung
- VI ☐ Bestimmte angeführte Unterlagen
- VII ☒ Bestimmte Mängel der internationalen Anmeldung
- VIII ☐ Bestimmte Bemerkungen zur internationalen Anmeldung

Datum der Einreichung des Antrags 14/05/1999	Datum der Fertigstellung dieses Berichts 17. 01. 00
Name und Postanschrift der mit der internationalen vorläufigen Prüfung beauftragten Behörde:  Europäisches Patentamt D-80298 München Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Bevollmächtigter Bediensteter Alonso y Goicolea, L Tel. Nr. +49 89 2399 7475



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INTERNATIONALER VORLÄUFIGER PRÜFUNGSBERICHT

Internationales Aktenzeichen PCT/EP98/07571

I. Grundlage des Berichts

1. Dieser Bericht wurde erstellt auf der Grundlage (*Ersatzblätter, die dem Anmeldeamt auf eine Aufforderung nach Artikel 14 hin vorgelegt wurden, gelten im Rahmen dieses Berichts als "ursprünglich eingereicht" und sind ihm nicht beigelegt, weil sie keine Änderungen enthalten.*):

Beschreibung, Seiten:

1-6 ursprüngliche Fassung

Patentansprüche, Nr.:

1-8 ursprüngliche Fassung

Zeichnungen, Blätter:

1/3-3/3 ursprüngliche Fassung

2. Aufgrund der Änderungen sind folgende Unterlagen fortgefallen:

- ☐ Beschreibung, Seiten:
- ☐ Ansprüche, Nr.:
- ☐ Zeichnungen, Blatt:

3. ☐ Dieser Bericht ist ohne Berücksichtigung (von einigen) der Änderungen erstellt worden, da diese aus den angegebenen Gründen nach Auffassung der Behörde über den Offenbarungsgehalt in der ursprünglich eingereichten Fassung hinausgehen (Regel 70.2(c)):

4. Etwaige zusätzliche Bemerkungen:

V. Begründete Feststellung nach Artikel 35(2) hinsichtlich der Neuheit, der erfinderischen Tätigkeit und der gewerblichen Anwendbarkeit; Unterlagen und Erklärungen zur Stützung dieser Feststellung

1. Feststellung

Neuheit (N)	Ja: Ansprüche	1-8
	Nein: Ansprüche	
Erfinderische Tätigkeit (ET)	Ja: Ansprüche	1-8
	Nein: Ansprüche	
Gewerbliche Anwendbarkeit (GA)	Ja: Ansprüche	1-8
	Nein: Ansprüche	

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INTERNATIONALER VORLÄUFIGER PRÜFUNGSBERICHT

Internationales Aktenzeichen PCT/EP98/07571

2. Unterlagen und Erklärungen

siehe Beiblatt

VII. Bestimmte Mängel der internationalen Anmeldung

Es wurde festgestellt, daß die internationale Anmeldung nach Form oder Inhalt folgende Mängel aufweist:

siehe Beiblatt

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Zu Punkt V

Begründete Feststellung nach Artikel 35(2) hinsichtlich der Neuheit, der erfinderischen Tätigkeit und der gewerblichen Anwendbarkeit; Unterlagen und Erklärungen zur Stützung dieser Feststellung.

Es wird auf die folgenden Dokumente verwiesen:

- D1: EP-A-0 796 766 (PHILIPS PATENTVERWALTUNG; PHILIPS ELECTRONICS NV (NL)) 24. September 1997 in der Anmeldung erwähnt
D2: WO 96 30822 A (FOREST DONALD K) 3. Oktober 1996

- 1 Die Erfindung betrifft eine Vorrichtung zur Steuerung einer Bildschirmanzeige mit einem Betätigungsglied.
- 2 Dokument D1 offenbart eine derartige Vorrichtung. Dabei dient das Betätigungsglied dazu, die Anzahl der Ebenen innerhalb der Menüstruktur zu vergrößern. Hierzu ist angegeben, die Ebenen über den Umfang der Bildschirmanzeige verteilt anzuordnen.

Eine derartige Vorrichtung bedeutet für den Benutzer eine zusätzliche Schwierigkeit, da er keine eindeutige Zuordnung zwischen der Zusatzbewegung und der Axial- bzw. Rotationsbewegung des Betätigungsglieds vorfindet. Auch gestaltet sich der Übergang zwischen den Ebenen und innerhalb der Menüstruktur für ihn nicht eindeutig und führt letztendlich zu einer erheblichen Ablenkung des Benutzers vom Verkehrsgeschehen.

- 3 Gegenüber dem Stand der Technik hat die Erfindung den wesentlichen Unterschied, daß bei ihr eine eindeutige Zuordnung zwischen der Bildschirmanzeige und den verschiedenen Bewegungsmöglichkeiten des Betätigungsglieds besteht.

Durch die Zusatzbewegung des Betätigungsglieds wird ein übergeordneter Punkt der Menüstruktur durch die Dreh- bzw. Längsbewegung des Betätigungsglieds ein demgegenüber untergeordneter Punkt der Menüstruktur ausgewählt. Im

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Randbereich sind die möglichen Menüs angeordnet, während sich im Mittelbereich die zugehörigen Untermenüs bzw. Funktionen oder Funktionswerte befinden.

Zu Punkt VII

Bestimmte Mängel der internationalen Anmeldung

Die Merkmale der Oberbegriffe der Ansprüche sind nicht mit in Klammern gesetzten Bezugszeichen versehen worden (Regel 6.2 b PCT).

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WELTORGANISATION FÜR GEISTIGES EIGENTUM
Internationales BüroINTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE
INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

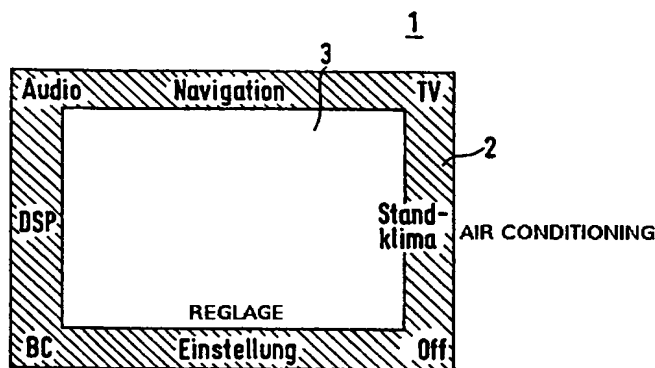
(51) Internationale Patentklassifikation ⁶ : G06F 3/033		A1	(11) Internationale Veröffentlichungsnummer: WO 99/27435
			(43) Internationales Veröffentlichungsdatum: 3. Juni 1999 (03.06.99)
(21) Internationales Aktenzeichen: PCT/EP98/07571 (22) Internationales Anmeldedatum: 24. November 1998 (24.11.98) (30) Prioritätsdaten: 197 52 056.1 25. November 1997 (25.11.97) DE 198 43 421.9 22. September 1998 (22.09.98) DE (71) Anmelder (für alle Bestimmungsstaaten ausser US): BAYERISCHE MOTOREN WERKE AKTIENGESELLSCHAFT [DE/DE]; Patentabteilung AJ-3, D-80788 München (DE). (72) Erfinder; und (75) Erfinder/Anmelder (nur für US): KUENZNER, Hermann [DE/DE]; Rennweg 10, D-85356 Freising (DE). HERRLER, Michael [DE/DE]; Herzogstrasse 120, D-80796 München (DE). MAUCLAIR, Isabelle [FR/DE]; Am Mühlbachbogen 12, D-85368 Moosburg (DE). (74) Gemeinsamer Vertreter: BAYERISCHE MOTOREN WERKE AKTIENGESELLSCHAFT; Patentabteilung AJ-3, D-80788 München (DE).		(81) Bestimmungsstaaten: JP, US, europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Veröffentlicht Mit internationalem Recherchenbericht. Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist; Veröffentlichung wird wiederholt falls Änderungen eintreffen.	

(54) Title: DEVICE FOR CONTROLLING A DISPLAY SCREEN

(54) Bezeichnung: VORRICHTUNG ZUR STEUERUNG EINER BILDSCHIRMANZEIGE

(57) Abstract

A device for controlling a display screen has an actuating element which can be rotated about a longitudinal axis and moved in the direction of the longitudinal axis, enabling a point of a menu structure consisting of menu, partial menus, functions and/or function values to be selected, and which can be represented as an optically highlighted field in the display screen. The actuating element has an initial position and can describe with relation thereto an additional movement with two additional degrees of freedom. The additional movement of the actuating element enables a field arranged in a marginal region (2) of the display screen and associated with a point of the menu structure to be selected. The rotary/longitudinal movement of the actuating element enables a subordinate field of the menu structure associated with the field arranged in the marginal region of the display screen to be selected in the central region (3) of the display screen enclosed by the marginal region.



Audio
Betätigung
Durch Neigen wird das
Audiomenu aufgerufen
ACTUATION AUDIO
MENU IS CALLED
UP BY STARTING

(57) Zusammenfassung

Bei einer Vorrichtung zur Steuerung einer Bildschirmanzeige mit einem Betätigungsglied, das um eine Längsachse drehbar und in Richtung der Längsachse bewegbar ist und wodurch ein Punkt einer aus Menü, Teilmenüs, Funktion und/oder Funktionswert bestehenden Menüstruktur auswählbar und als optisch hervorgehobenes Feld in der Bildschirmanzeige darstellbar ist, bei der das Betätigungsglied eine Ausgangslage besitzt und demgegenüber eine Zusatzbewegung mit zwei zusätzlichen Freiheitsgraden durchführen kann, ist bei der Zusatzbewegung des Betätigungsglieds ein in einem Randbereich (2) der Bildschirmanzeige angeordnetes und einem Punkt der Menüstruktur zugeordnetes Feld auswählbar, und mittels der Dreh-/Längsbewegung des Betätigungsglieds ist ein diesem Feld zugeordnetes, innerhalb der Menüstruktur untergeordnetes Feld in dem vom Randbereich umfaßten Mittelbereich (3) der Bildschirmanzeige auswählbar.

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Vorrichtung zur Steuerung einer Bildschirmanzeige

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Die Erfindung bezieht sich auf eine Vorrichtung mit den Merkmalen des Oberbegriffs von Patentanspruch 1.

- 10 Eine derartige Vorrichtung ist aus der EP 0 796 766 A2 bekannt. Dabei dient das Betätigungsglied dazu, die Anzahl der Ebenen innerhalb der Menüstruktur zu vergrößern. Hierzu ist angegeben, die Ebenen über den Umfang der Bildschirmanzeige verteilt anzuordnen. Eine derartige Vorrichtung bedeutet für den Benutzer eine zusätzliche Schwierigkeit, da er keine eindeutige Zuordnung zwischen der Zusatzbe-
- 15 wegung und der Axial- bzw. Rotationsbewegung des Betätigungsglieds vorfindet. Auch gestaltet sich der Übergang zwischen den Ebenen und innerhalb der Menüstruktur für ihn nicht eindeutig und führt letztendlich zu einer erheblichen Ablenkung des Benutzers vom Verkehrsgeschehen.
- 20 Der Erfindung liegt die Aufgabe zugrunde, eine Vorrichtung der eingangs genannten Art zu schaffen, bei der eine eindeutige Zuordnung zwischen der Bildschirmanzeige und den verschiedenen Bewegungsmöglichkeiten des Betätigungsglieds besteht.

Die Erfindung löst diese Aufgabe durch die Merkmale des Patentanspruchs 1.

25

- Nunmehr wird durch die Zusatzbewegung des Betätigungsglieds ein übergeordneter Punkt der Menüstruktur durch die Dreh- bzw. Längsbewegung des Betätigungsglieds ein demgegenüber untergeordneter Punkt der Menüstruktur ausgewählt. Konkret bedeutet dies beispielsweise, daß im Randbereich die möglichen Menüs
- 30 angeordnet sind, während sich im Mittelbereich die zugehörigen Untermenüs bzw. Funktionen oder Funktionswerte befinden. Dabei sind im Mittelbereich nur die Teilmenüs, die Funktion bzw. Funktionswerte angeordnet, die zu dem einen, vorzugs-

weise durch eine vorhergehende Zusatzbewegung des Betätigungsglieds ausgewählten Menü gehören. Im Randbereich befinden sich somit die innerhalb der Menüstruktur auf gleicher Stufe stehenden Punkte, während im Mittelbereich die hierarchisch niedrigeren Punkte zu finden sind.

5

Wie an sich aus der EP 0 796 766 A bekannt ist, kann das Betätigungsglied sowohl eine Taumbewegung als auch eine Parallelverschiebung als Zusatzbewegung durchführen und dabei auch zwangsgeführt sein. Diese Bewegungsmöglichkeiten bzw. -einschränkungen verbessern den Umgang mit und die Bewegung innerhalb
10 der Menüstruktur. Ausgehend von der Mittellage als Ausgangslage des Betätigungsglieds ist die Zusatzbewegung gleichbedeutend mit einem Verlassen der durch die im Mittelbereich angegebenen Ebene der Menüstruktur und das Ausschauen der nächsthöheren Ebene. Die Zurückbewegung in die Ausgangslage bedeutet wiederum den Übergang von der soeben aufgesuchten höheren Ebene in die darunter
15 liegende nächste Ebene. Der Benutzer erhält damit taktil ein Gefühl dafür vermittelt, in welcher Weise er sich innerhalb der Menüstruktur bewegt.

Eine Verbesserung der Erfindung beschäftigt sich mit dem Problem der Fehlbedienung, die bei einer derartigen Vorrichtung auftreten kann. Besonders dann, wenn
20 eine Vielzahl von Punkten im Rahmenbereich der Bildschirmanzeige angeordnet ist, ist die Gefahr besonders groß, versehentlich nicht den gewünschten Punkt zu „treffen“. Hinzu kommt die besondere Situation, in der die Auswahl dieser Punkte erfolgt. Häufig erfolgt die Hinwendung zur Bildschirmanzeige in Konkurrenz zum Verkehrsgeschehen. Die dafür zur Verfügung stehende Zeit ist i.d.R. knapp bemessen.
25

Werden die im Rahmenbereich angeordneten Punkte bei und/oder nach der Zusatzbewegung optisch hergehoben und erst dann ausgewählt, wenn das Betätigungsglied sich zumindest annähernd wieder in der Ausgangslage befindet, wird die
30 Gefahr einer Fehlauswahl weitgehend vermieden.

Mit Hilfe der Zusatzbewegung ist es zwar möglich, den im Rahmenbereich angeordneten Punkt der Menüstruktur optisch auszuwählen. Funktionell erfolgt die Auswahl jedoch erst dann, wenn das Betätigungsglied sich wieder in der Ausgangslage befindet. Unter funktioneller Auswahl ist dabei bei Einsatz der Vorrichtung in einem Fahrzeug zur Steuerung verschiedener Menüs, wie Navigationssystem, Bordcomputer, Klimaanlage usw. und der Zuordnung der im Rahmenbereich angeordneten Punkte zu den einzelnen Menüs folgendes zu verstehen:

Durch die Zusatzbewegung des Betätigungsglieds wird der dem jeweiligen Menü zugeordnete Abschnitt des Randbereichs optisch hervorgehoben, beispielsweise gehighlightet. Die Auswahl und damit Ansteuerung des jeweiligen Menüs, z. B. der Navigation erfolgt jedoch erst dann, wenn nach der optischen Hervorhebung des entsprechenden Randbereichsabschnitts das Betätigungsglied wieder in die Ausgangslage zurückgeführt wird. Erst dann wird das Navigationssystem anstelle des vorher auf den Bildschirm dargestellten Menüs, beispielsweise für den Bordcomputer, ausgewählt. Werden dabei die Teilmenüs und/oder Funktionen und/oder Funktionswerte innerhalb der vom Rahmenbereich umgebenen Innenfläche der Bildschirmanzeige als Punkte (z. B. in Form von rechteckigen Feldern) dargestellt, können nun diese Punkte vorzugsweise mit Hilfe des Betätigungsglieds aktiviert werden.

Der Übergang zu einem anderen Menü erfordert wiederum die vorbereitende Auswahl des jeweiligen Randbereichsabschnitts mit Hilfe des Betätigungsglieds, verbunden mit der optischen Hervorhebung dieses Ausschnitts und der anschließenden funktionellen Auswahl durch Rückführen des Betätigungsglieds in die Ausgangslage.

Anhand der Zeichnung ist die Erfindung weiter erläutert. Es zeigt

Fig. 1 eine Bildschirmanzeige, die im Rahmen der erfindungsgemäßen Vorrichtung verwendet wird,

Fig. 2 die Bildschirmanzeige von Fig. 1 bei Ansteuerung durch ein aus der EP 0 796 766 A bekanntes Betätigungsglied.

Fig. 3 eine Weiterbildung der Vorrichtung von Fig. 1 und 2 und

5

Fig. 4 und 5 die Wirkungsweise der Vorrichtung von Fig.3.

In Fig. 1 ist die im Rahmen der Erfindung vorgesehene Bildschirmanzeige prinzipiell dargestellt. Innerhalb einer Anzeigefläche 1, die gleich der Bildfläche eines Bild-
10 schirms ist, befindet sich ein Randbereich 2 und ein Mittelbereich 3. Im Randbereich 2 sind an acht Stellen, die bezogen auf den Mittelpunkt der Anzeigefläche 1 in etwa jeweils um 45° gegeneinander versetzt sind, acht Symbole für die mit einem nicht dargestellten Betätigungsglied anzusteuern den Menüs dargestellt. Es handelt sich dabei um die Menüs Audio, Navigation, Fernsehen (TV), Stand-Klima usw..
15 „Einstellung“ bedeutet, den insgesamt einstellbaren Funktionen bzw. Funktionswerte zugeordnet, „Off“ steht für die Möglichkeit, die Bildschirmanzeige auszuschalten.

Durch eine Zusatzbewegung (Taumel- bzw. Parallelbewegung) des Betätigungsglieds (nicht dargestellt) kann einer der acht Menüpunkte ausgewählt werden. Hier-
20 zu ist das Betätigungsglied in einer durch einen Pfeil 4 symbolisierten Richtung zu bewegen. Hier wird der Menüpunkt Audio ausgewählt. Diese Auswahl geschieht durch Bewegen des Betätigungsglieds in der durch den Pfeil 4 angegebenen Richtung um eine Strecke bzw. einen Winkel, der ein vorgegebenes Maß übersteigt. Damit ist der Menüpunkt „Audio“ ausgewählt.

25

Nach Loslassen geht das Betätigungsglied unter der Wirkung einer Rückstellkraft wieder in die Ruhelage zurück. Gleichzeitig erscheinen innerhalb der Anzeigefläche 1 die dem Menüpunkt 4 zugeordneten hierarchiemäßig untergeordneten Menüpunkte. Es handelt sich dabei um die innerhalb eines nicht dargestellten
30 Rundfunkgeräts fest programmierten Sendestationen. Diese werden im Mittelbereich angezeigt. Dies ist in Fig. 2 gezeigt. Eines der Symbole, hier „Antenne“ ist optisch hervorgehoben. Es handelt sich dabei um das Symbol des Senders, der zuletzt

ausgewählt wurde. Nimmt der Fahrzeugbenutzer keine weiteren Einstellungen vor, so bleibt dieser Sender eingestellt.

5 Möchte er hingegen den Sender ändern, so dreht er hierzu das Betätigungsglied um seine Längsachse. Es handelt sich dabei um einen Dreh-Druck-Knopf, wie er aus der EP 0 366 132 B1 bekannt ist, und auch in der EP 0 796 766 A beschrieben ist. Dabei wird eines der den anderen Sendern zugeordneten Symbole, z. B. Klassik optisch anstelle von Antenne hervorgehoben. Die Umschaltung auf diesen Sender erfolgt, indem der Dreh-Druck-Knopf in Längsrichtung bewegt wird. Unter der Wirkung einer Rückstellfeder geht er anschließend wieder in seine Ausgangslage zurück.
10

Soll nun auf eine Funktion eines anderen Menüs, beispielsweise des Menüs BC=Bordcomputer umgeschaltet werden, ist hierzu der Dreh-Druck-Knopf in der
15 durch den Pfeil BC angegebenen Richtung zu verschwenken bzw. parallel zu verschieben. Mit dem Verschwenken einher geht die Anzeige der verschiedenen Funktionen des Bordcomputers im Mittelbereich anstelle der in Fig. 2 dargestellten Sendersymbole. Eine Bordcomputer-Funktion, z. B. Reichweite kann standardmäßig oder nach vorbereitender Axialbewegung des Dreh-Druck-Knopfs hervorgehoben
20 sein. Die Auswahl dieser Funktion, d. h. die Anzeige der tatsächlichen Reichweite des Fahrzeugs, kann dann erfolgen, indem der Dreh-Druck-Knopf gegebenenfalls nochmals axial bewegt wird. Im Mittelbereich erscheint beispielsweise neben dem optisch hervorgehobenen Symbol „Reichweite“ der Wert der Reichweite, z. B. 225 km.

25 Unmittelbar danach kann auf das Menü Navigation umgeschaltet werden, indem die Zusatzbewegung des Dreh-Druck-Knopfs in Richtung des Pfeils „Navigation“ durchgeführt wird. Im Mittelbereich erscheinen die einzelnen Navigationsparameter.

30 Auf diese Weise ist es möglich, rasch und sicher zwischen den einzelnen Menüs, den Teilmenüs, Funktionen und Funktionswerte umzuschalten.

Die anhand von Fig. 3 ff. dargestellte Weiterbildung der Erfindung besteht darin, beim translatorischen Verschieben des Betätigungsglieds nicht sofort einen Funktionswechsel auszulösen, sondern zunächst nur eine Hervorhebung, z. B. ein "highlighting", des gewählten Hauptmenüpunkts vorzunehmen. Dadurch ist zu diesem Zeitpunkt noch eine Korrektur durch den Bedienenden möglich. Die eigentliche Funktionsauslösung erfolgt erst mit dem Loslassen des federzentrierten Betätigungsglieds.

Der Nutzer möchte den Funktionsbereich "Audio" aufrufen. Im Beispiel von Fig. 3 wurde statt "Audio" versehentlich der Menüpunkt "Navigation" gewählt. Würde jetzt sofort das zugehörige Untermenü aufgerufen, befände sich der Bediener im Navigationsmenü.

Um dies zu Vermeiden, erfolgt der Aufruf des jeweiligen Untermenüs nicht sofort bei der Auswahl, sondern erst beim Loslassen des Betätigungsglieds. Im Beispiel erkennt der Nutzer an der Hervorhebung von "Navigation", daß der falsche Menüpunkt gewählt ist und kann das Betätigungsglied nach links auf den gewünschten Menüpunkt "Audio" schieben. Dies zeigt Fig. 4. Auch jetzt ist die zugehörige Funktion „Menü“ Audio noch nicht aktiviert.

20

Erst durch Loslassen des federzentrierten Betätigungsglieds erfolgt der Aufruf des gewünschten Untermenüs "Audio", wie in Fig. 5 gezeigt. Fig. 5 unterscheidet sich gegenüber der in Fig. 2 dargestellten Situation nur insoweit, als nunmehr die Beschriftung des aktivierten Menüs im Rahmen optisch hervorgehoben bleibt.

25

Patentansprüche

5

1. Vorrichtung zur Steuerung einer Bildschirmanzeige mit einem Betätigungsglied,
das um eine Längsachse drehbar und in Richtung der Längsachse bewegbar ist
und wodurch ein Punkt einer aus Menü, Teilmenüs, Funktion und/oder Funkti-
10 onswert bestehenden Menüstruktur auswählbar und als optisch hervorgehobenes
Feld in der Bildschirmanzeige darstellbar ist, bei der das Betätigungsglied eine
Ausgangslage besitzt und demgegenüber eine Zusatzbewegung mit zwei zusätz-
lichen Freiheitsgraden durchführen kann, dadurch gekennzeichnet, daß bei
der Zusatzbewegung des Betätigungsglieds ein in einem Randbereich der Bild-
15 schirmanzeige angeordnetes und einem Punkt der Menüstruktur zugeordnetes
Feld auswählbar ist, und daß mittels der Dreh-/Längsbewegung des Betätigungs-
glieds ein diesem Feld zugeordnetes, innerhalb der Menüstruktur untergeordne-
tes Feld in dem vom Randbereich umfaßten Mittelbereich der Bildschirmanzeige
auswählbar ist.
- 20 2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Betäti-
gungsglied eine Taumelbewegung als Zusatzbewegung durchführen kann.
3. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Betäti-
25 gungsglied eine Parallelverschiebung als Zusatzbewegung durchführen kann.
4. Vorrichtung nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß das
Betätigungsglied für die Zusatzbewegung zwangsgeführt ist.
- 30 5. Vorrichtung nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet,
daß das Betätigungsglied eine reversible Zusatzbewegung durchführt.

6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß das Betätigungsglied die Zusatzbewegung gegen die Wirkung einer Feder ausführt.
7. Vorrichtung nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet,
5 daß die im Rahmenbereich angeordneten Punkte bei und/oder nach der Zusatzbewegung optisch hergehoben sind und erst dann ausgewählt sind, wenn das Betätigungsglied sich zumindest annähernd wieder in der Ausgangslage befindet.
8. Vorrichtung nach einem der Ansprüche 1 bis 7 dadurch gekennzeichnet,
10 daß bei Auswahl des Feldes im Randbereich die zugeordneten auswählbaren Felder im Mittelbereich selbständig angezeigt sind.

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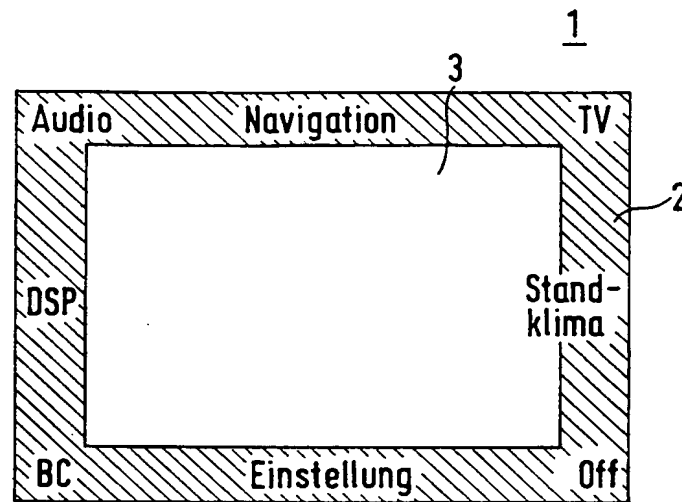


FIG. 1

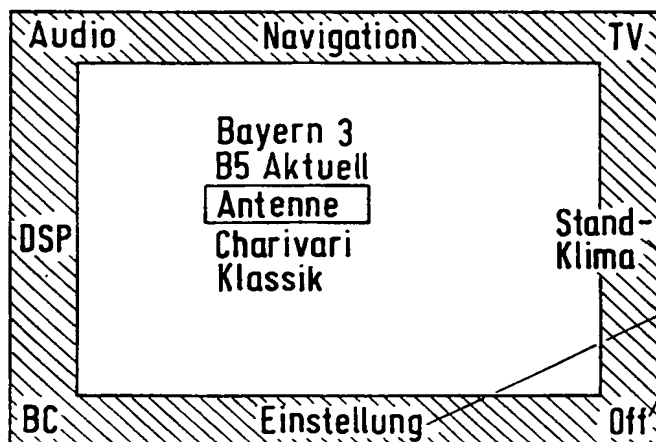
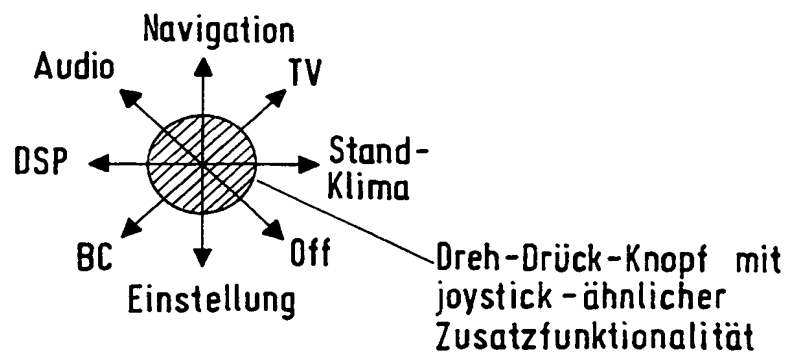


FIG. 2





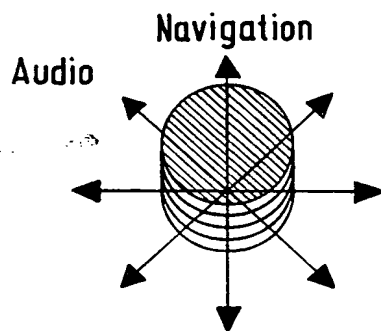
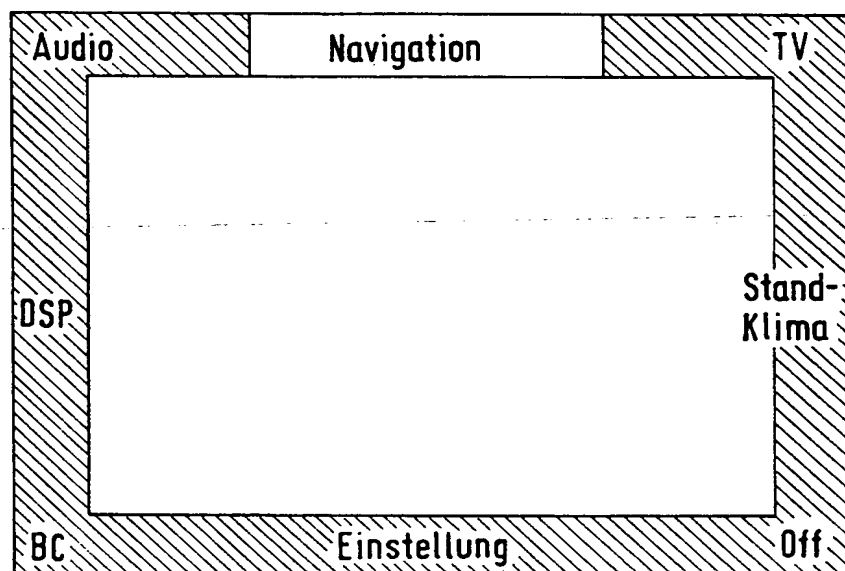
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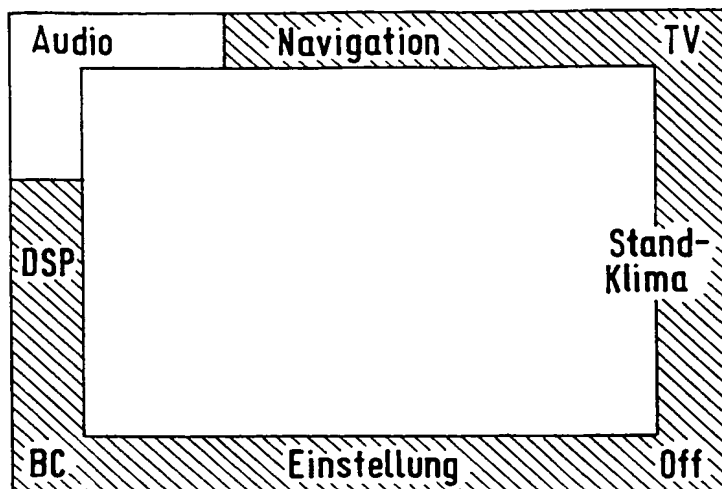


FIG. 4

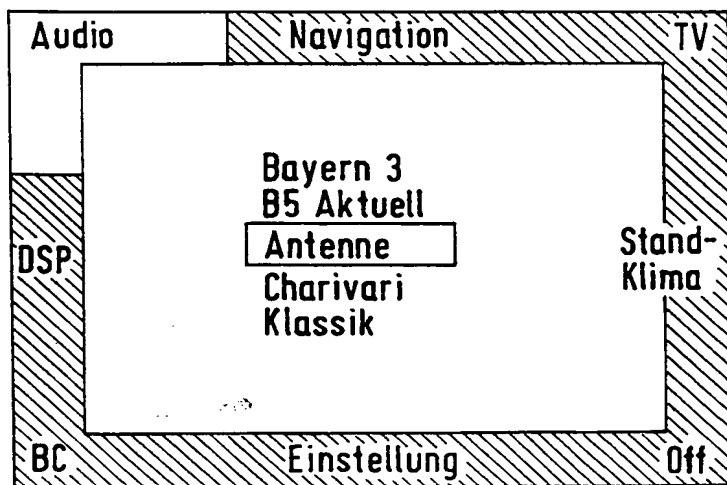
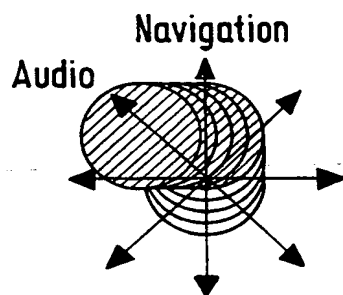
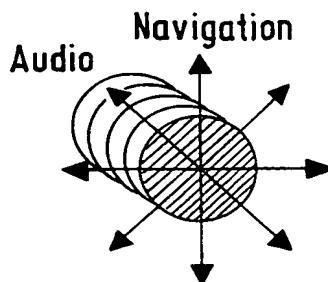


FIG. 5





INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 98/07571

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G06F3/033

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 796 766 A (PHILIPS PATENTVERWALTUNG ;PHILIPS ELECTRONICS NV (NL)) 24 September 1997 cited in the application	1
A	see the whole document	2-6
Y	WO 96 30822 A (FOREST DONALD K) 3 October 1996	1
A	see page 42, line 18 - line 34 see page 86, line 15 - line 25 see figure 19 see figures 52,53,64,65	7
A	US 4 794 388 A (MATTHEWS HENRY G) 27 December 1988 see column 11, line 45 - column 12, line 37; claims 1-3; figures 1,4	1-6
	-/--	

☒ Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search

30 March 1999

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 98/07571

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 498 082 A (KONINKL PHILIPS ELECTRONICS NV) 12 August 1992 see column 6, line 22 - line 35; figures 3,7 ---	1,7
A	US 5 297 253 A (MEISEL LESLIE M) 22 March 1994 see column 7, line 9 - line 37; figures ---	1
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Information on patent family members

International Application No

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INTERNATIONALE RECHERCHENBERICHT

tionales Aktenzeichen

PCT/EP 98/07571

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
IPK 6 G06F3/033

Nach der Internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK

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Recherchierte Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)

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Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie ^a	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
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Datum des Abschlusses der internationalen Recherche

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Absendedatum des internationalen Recherchenberichts

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Bevollmächtigter Bediensteter

Durand, J

C.(Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN		
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INTERNATIONALE RESEARCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen

PCT/EP 98/07571

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displayed on the selectable regions cannot be seen in a glance by many operators. However, when the displayed menu options are displayed on the indicating regions, for example, as shown in Figure 52, the displayed menu options can be seen in a glance, facilitating searching of the menu by the operator for his intended menu option. Since the location of each selectable region is indicated by the location of the associated indicating region, the operator may point to the intended selectable region without searching it out or pausing to verify that the menu option associated with a selectable region is the menu option he desires. The frequent operator of such a menu interface may habituate the process of selecting an intended menu option so he can focus his attention on another task while selecting the option, for example, planning his next interaction with the menu interface.

Figure 53 depicts a display and structures in accord with an another embodiment of the Location Indication aspect of the invention. Selectable regions (4604), (4608), (4612), (4616), (4620), (4624), (4628) and (4632) are located adjacent the display (2112) and associated respectively with menu options "so", "say", "she", "suffixes", "said", "show", "some" and "words". Each selectable region is unbounded on the side furthest from and parallel to the edge of the display. Indicating regions (4351), (4353), (4355), (4357), (4367), (4361), (4363) and (4365) are associated respectively with menu options "so", "say", "she", "suffixes", "said", "show", "some" and "words". In accord with the Location Indication aspect of the invention, the location of an indicating region indicates the location of the selectable region associated with the menu option associated with the indicating region.

The large size of the selectable regions outside the display, for example, as shown in Figure 53, facilitate selection by individuals with impaired fine motor control while the indicating regions indicate the location of each associated selectable region.

Yet another embodiment in accord with the Location Indication aspect of the invention is shown in Figures 54 and 55. Figure 54 depicts a display (2112) having thereon eight selectable regions, each associated respectively with a menu option. As shown in the Figure, selectable region (3911) is associated with menu option "aeiou", selectable region (3910) with menu option "gqjyvwxz", selectable region (3908) with menu option "setup", selectable region (3907) with menu option undo, selectable region (3905) with menu option "control", selectable region (3904) with menu option "words", selectable region (3902) with menu option "nsrm<space>tcp" and selectable region (3901) with menu option "bdfhkl". Menu option "aeiou" is associated with a submenu which

includes submenu options "a", "e", "i", "o" and "u", displayed on indicating regions (3930), (3928), (3926), (3924) and (3922) respectively. The background pattern of indicating region (3930) matches the background pattern of selectable region (3908), indicating that submenu option "a" will be associated with selectable region (3908) following selection of menu option "aeiou".

5 Similarly, the background pattern of indicating region (3928) matches the background pattern of selectable region (3910), indicating that submenu option "e" will be associated with selectable region (3910) following selection of menu option "aeiou". Alternatively, the indication may be made by the size, shape, hue, brightness, contrast, dithering, fill, blinking, hatching or pattern of the indicating region or any part thereof, including either of the foreground and background of the
10 indicating region.

When the operator selects selectable region (3911), the display (2112) changes to that shown in Figure 55. Now, selectable region (3910) is associated with submenu option "e", selectable region (3908) with submenu option "a", selectable region (3904) with submenu option "u", selectable
15 region (3902) with submenu option "o" and selectable region (3901) with submenu option "i". In accord with the Location Indication aspect of the invention, the appearance of an indicating region indicates the location of the selectable regions associated with the submenu option associated with the indicating region.

20 The embodiment shown in Figures 54 and 55 illustrates how the Location Indication aspect of the invention speeds selection of a submenu option of a menu hierarchy. The operator, by observing the background pattern of the submenu option within the displayed menu option, may determine which selectable region he should next dwell on. The operator may make this determination prior to selection of the menu option and need not wait for the submenu options to be displayed on their
25 associated selectable regions. In accordance with the Location Indication aspect of the invention, the operator may select or spell out words more quickly than with conventional automated menu hierarchy. Assuming the display (2112) is part of computer system, these words may be input to an application program, and, if the computer system is coupled to a speech synthesizer, these words may be spoken.

30 Figure 56 depicts another apparatus in accord with the Location Indication aspect of the invention. An example of the operation of this apparatus will now be described. Figure 56 depicts display area (4770) adjacent to which are located selectable regions (4701), (4703), (4705), (4707), (4709), (4711), (4713) and (4715). Not shown in the Figure are three sets of eight menu options. At

different times during the operation of the apparatus shown in Figure 56, for example at one second intervals, the plurality of selectable regions is associated with a different set of eight menu options such that, for a one second period, each selectable region is associated respectively with one menu option of the associated set of menu options. On the display area are 24 indicators, each associated
5 respectively with one of the menu options. Each indicator indicates when a selectable region is associated with the menu option associated with the indicator. Thus, each of the indicators (4721), (4723), (4725), (4727), (4729), (4731), (4733) and (4735) is associated respectively with a menu option which may be in turn associated respectively, for example, during a first one second period, with one of the selectable regions. The operator may select a desired one of the 24 menu options
10 by selecting the associated selectable region during the period when the desired menu option is associated with the associated selectable region.

Alternatively, the apparatus shown in Figure 56 may require two successive selection events, the first selection event to select a set of eight menu options or to select a set of three menu options, the
15 set being associated with one selectable region, and the second selection event to select one of the selected set. For example, the first selection event may select the set of menu options associated with indicators (4773), (4753) and (4733), and the second selection event may select one menu option from this set.

20 Still another apparatus in accord with the Location Indication aspect of the invention is shown in Figure 57. Figure 57 depicts display area (4770) outside of which are located selectable regions (5001), (5003), (5005), (5007), (5009), (5011), (5013), (5015), (5021), (5023), (5025), (5027), (5029), (5031), (5033) and (5035). The location of each selectable region is indicated by an indicating region on the display area, (5041), (5043), (5045), (5047), (5049), (5051), (5053),
25 (5055), (5061), (5063), (5065), (5067), (5069), (5071), (5073) and (5075), respectively.

The Location Indication aspect of the invention will now be described from an implementation perspective with reference to Figure 52. Preferably, the Location Indication aspect is implemented by modifications to the access program (1206) described in the detailed description of the
30 Perimeter Menu aspect of the invention. The modifications required for the Location Indication aspect of the invention are: (1) at initialization time: (a) create twelve child edit windows, each corresponding to one of the indicating regions shown in Figure 52, each of the class "edit", each having the style (WS_CHILD | WS_BORDER | WS_DISABLED | ES_MULTILINE | AlignmentStyle) where "|" represents a logical OR operation and where AlignmentStyle equals

ES_RIGHT for child windows having right justified text and ES_LEFT for child windows having left justified text, as shown in Figure 52; (b) move the child edit windows so they are located in or near the center of the display; (c) display the child edit windows; and (d) initialize an array which maps each child edit window, for example, by an index between 0 and 11 inclusive, to an element of the aLabel array; and (2) modify the code implementing ST_SELECTED state processing, so that after changing the menu options associated with various selectable regions (by changing the pLabel element of the data set associated with each of the state machines to point to the menu option in the aLabel array to be associated with that state machine), the array mapping each child window to an element of the aLabel array is used to access the text of the menu option and the text of each child edit window is set accordingly. In the preferred embodiment, the six menu options displayed in indicating regions (4371), (4374), (4375), (4381), (4383) and (4385) are present in the aLabel array when Figure 52 is shown, but are not associated with selectable regions until the operator selects menu option "words".

I. Sound Match

The preferred embodiment of the Sound Match aspect of the invention will now be described in detail from a functional perspective using an example depicted in Figure 58. Figure 58 shows a display (2112) of a computer system (2116) having thereon six regions or sound indicators, (5801), (5803), (5805), (5807), (5809), and (5811), each associated with a menu option, "ypgqj", "ldhbfk", "wizen", "words", "vort x", and "sumac", respectively. Each menu option is displayed on its associated sound indicator. Each sound indicator has a distinct hue. For example, sound indicator (5801) may be green, (5803) white, (5805) blue, (5807) red, (5809) orange and (5811) grey. Each of these sound indicators indicates a sound the operator is able to consistently produce, for example, the vowel sound e as it sounds in green, i as it sounds in white, u as it sounds in blue, e as it sounds in red, o as it sounds in orange and e it sounds in grey. Assuming the operator says o as it sounds in orange, "vort x", the menu option associated with the orange sound indicator (5809) is selected and the display is changed to that shown in Figure 59. In the preferred embodiment, submenu options space, "x", "r", "t", "v" and "o" are now associated with each of the sound indicators (5901), (5903), (5905), (5907), (5909), and (5911) respectively. Assuming the operator says e as in green, submenu option space is selected and a space is input to the application program (6107) whose output appears in region (5850).

Figure 60 illustrates a display and structures in accordance with an alternative embodiment of the

Sound Match aspect of the invention. Figure 60 depicts a display (2112) of a computer system (2116). Adjacent the display (2112) is a static display (6252) having thereon eight sound indicators (6204), (6208), (6212), (6216), (6220), (6224), (6228), and (6232). Each of the eight sound indicators is a symbol in a phonetic character set graphically representing a sound. Alternatively, the sound indicators may include a picture of an object, for example, a tree, a house, a boy, or a map of a country, or may include a shape, for example, a square, a circle, or a triangle, or may include a hue indicator, a pitch indicator, a volume indicator, a sound duration indicator, a change in pitch indicator, or a change in volume indicator. Eight menu options, "vort<space>x", "sumac", "wizen", "undo", "words", "talk", "ldhbfk" and "ypgqj", are displayed on the display (2112), each adjacent and associated respectively with one of the sound indicators, the eight menu options together circumscribing region (6250) on the display. The operator may select any one of the menu options by producing the sound indicated by the sound indicator associated with the menu option. In response to a menu selection, submenu options of the selected menu option may be displayed and associated respectively with a sound indicator.

An operator with impaired speech but who is able to consistently produce a relatively small number of sounds distinguishable by conventional speech recognition means may, in accord with the Sound Match aspect of the invention, select from among the small number of menu options by using the sounds he can produce. Assuming the display (2112) is part of computer system, the menu option may represent inputs to an application program, and, if the computer system is coupled to a speech synthesizer, the menu option may represent words to be spoken.

Figure 61 illustrates a display and structures in accordance with an alternative embodiment of the Sound Match aspect of the invention. Figure 61 depicts a display (2112) of a computer system (2116) having thereon six square sound indicators, (6401), (6403), (6405), (6411), (6413), and (6415) arranged in two columns of three sound indicators. Each sound indicator abuts a sound indicator in the other column, the sound indicator located above it, if any, and the sound indicator located below it, if any. Assume that the operator is entering Chinese, that he uses a keyboard to enter a phonetic unit and intonation according to the Pin Yin coding method for the Chinese language, and that he enters the distinct sound "fú", each of the sound indicators shown in Figure 61 is associated respectively with a menu option, each of the plurality of menu options having a common characteristic. In this example, the menu options are homophones and the common characteristic is a phonetic unit and intonation but may be a phonetic unit alone, an intonation alone, a stroke used to draw an ideograph, a number of horizontal strokes, a number of vertical

strokes, a number of total strokes, a stroke order, a radical, a part of speech, an ideograph, a kana, a diacritic, a classification of a part of an ideograph or other characteristic of a class of ideographs. Each of the sound indicators has a distinct hue. The operator may select any one of the displayed menu options, according to the Sound Match aspect of the invention, by speaking the sound
5 associated with the sound indicator associated with the desired menu option. For example, assume the operator says, "blue" or a translation thereof, preferably a Chinese translation in this example. The ideograph located on the blue sound indicator is selected. In this example, this ideograph is input to a word processing program and appears on the display (2112).

10 The Sound Match aspect of the invention thus allows an operator to select from an option from a menu, using speech recognition means, whether or not the menu options are homophones. The operator does not need to use his hands to make this selection and so may keep both his hands on the home row of the keyboard, in preparation for entering the next common characteristic, or, if specifying the common characteristic by voice, may select a menu option without interrupting the
15 manual activity he's engaged in.

The preferred embodiment of the Sound Match aspect of the invention will now be described in detail from an implementation perspective, beginning with the hardware and software operating environment which will now be described with reference to Figure 62 which depicts a speech
20 recognition system (6001) including a computer system (2116) and keyboard (2210), as earlier described, a sound board (6007) and a microphone (6009). The conventional computer system (2116) preferably includes an 80486 CPU running at 33MHz or faster, and is provided with Dragon Dictate Power Edition software, available from Dragon Systems, Inc., Newton, Massachusetts, USA. Preferably, the sound board is the Audio Capture Playback Adaptor and the microphone is
25 the Shur Headset microphone, both available from Dragon Systems, Inc. Figure 63 depicts the software environment of the preferred embodiment, which includes the earlier described Windows® version 3.1 operating system (1204), an optional Windows® application program (6107), the Windows® Dragon software driver (6101) included in the Dragon Dictate Power Edition software, the Dragon Application (6103) included in the Dragon Dictate Power Edition
30 software, and a speech recognition access program (6105). The Dragon Application (6103) is configured to match a sample of each of six sounds distinguishable by the Dragon Application (6103) which the operator can consistently produce. Using the example described above, these are the vowel sounds produced by the operator of e as it sounds in green, i as it sounds in white, u as it sounds in blue, e as it sounds in red, o as it sounds in orange and e it sounds in grey. Each of these

sounds is associated respectively with an identifier, for example, a number or a sequence of one or more characters. The speech recognition access program (6105) is preferably a Windows® application program developed using, in part, the Voice Tools Software Development Kit available from Dragon Systems, Inc. At initialization time, the speech recognition access program (6105) defines an array of data structures defining the menu and submenu options and the menu hierarchy. For example, one of the elements of this array determines that, on selection, certain actions are to be taken, for example, inputting text to an application program, and that certain submenu options and related data are to be associated with certain child edit windows. Also at initialization time, the speech recognition access program (6105) initializes callback procedures using the Dragon Application's Application Program Interface to receive notification from the Dragon Application when a sound has been matched. Also at initialization time, the main window of the speech recognition access program (6105) is preferably sized to just encompass the sound indicators shown in Figure 58. Also at initialization time, the speech recognition access program (6105) creates six child edit controls, each corresponding to one of the sound indicators shown in Figure 58. Each of the child edit controls has the background color described above and a text color of black or white depending upon which provides better contrast against the background color of the child edit control, and each is located on the display (2112) as shown in Figure 58. Also at initialization time, the menu options of the initial menu are each associated respectively with one of the child edit controls. After initialization, the speech recognition access program (6105), upon notification from the Dragon Application that a sound has been received and a match attempted, sequentially searches the list of identifiers matched to the sound by the Dragon Application (6103), starting with the best match, until it finds an identifier corresponding to any one of the six sounds distinguishable by the Dragon Application (6103). Assuming the operator says o as it sounds in orange, the Dragon Application (6103) provides to the speech recognition access program (6105) a list of matches including, before any other identifier corresponding to any one of the six sounds distinguishable by the Dragon Application (6103), the identifier associated with child edit control (5809). This child edit control is currently associated with menu option "vort x", the matched menu option. The speech recognition access program (6105) then sets the text of each of the child edit controls to one of the submenu options associated with the matched menu option. In the example above, submenu options space, "x", "r", "t", "v" and "o" are associated with each of the child edit controls respectively and the text of the associated child edit control is set to the submenu option. Assuming the operator says e as in green, submenu option space is the matched submenu option and a space is input to the application program (6107) whose output appears in region (5850). Preferably the application program (6107) is an application program capable of executing

a WM_SIZE command so that the speech recognition access program (6105) may size the windows of the application program (6107) to fit neatly in region (5850) and is capable of executing WM_CHAR messages so that the speech recognition access program (6105) may input characters to the application program (6107).

5

J. Ideographic Language

The preferred embodiment of the Ideographic Language aspect of the invention will now be described in detail from a functional perspective using an example depicted in Figure 64. Figure 10 64 shows the display (2112) of a general purpose computer system (2218 in Figure 15) and 12 selectable regions. Each of the 12 selectable regions consists of the union of a visible subregion on the display (2112) and an invisible subregion located outside the display (2112) and adjacent the visible subregion. For example, the selectable region in the upper left corner both above and below the top of the display (2112) in Figure 64 consists of invisible subregion (3604) and visible 15 subregion (3606), and hereinafter is referred to as selectable region (3604/3606). The other selectable regions shown in Figure 64, proceeding counter clockwise from selectable region (3604/3606) are (3608/3610), (3612/3614), (3616/3618), (3620/3622), (3624/3626), (3644/3646), (3648/3650), (3652/3654), (3656/3658), (3660/3662) and (3664/3666). In Figure 64 each of the visible subregions is adjacent an edge of the display (2112). The selectable regions together 20 circumscribe region (3680) in the center of the display. Also shown on the display (2112) within region (3680) in Figure 64 are ten square indicating regions arranged in two columns of five indicating regions. Each indicating region abuts an indicating region in the other column, the indicating region located above it, if any, and the indicating region located below it, if any. In the preferred embodiment, each indicating region indicates by its location the location of a respectively 25 associated selectable region, in accord with the Location Indication aspect of the invention. For example, the uppermost indicating region in the left column of indicating regions (3605) is associated with the uppermost selectable region (3604/3606) on the left side of the display. Indicating region (3609) located immediately below indicating region (3605) is associated with selectable region (3608/3610) located immediately below selectable region (3604/3606).

30

The operation of the example of the preferred embodiment of the Ideographic Language aspect of the invention will now be described. Assuming that the operator is fitted with a head pointer coupled to the general purpose computer system (2218), that he uses a keyboard to enter a phonetic unit and intonation according to the Pin Yin coding method for the Chinese language, and that he

enters the distinct sound "fú", each of the plurality of the selectable regions shown in Figure 64 is associated with one of a plurality of menu options, each of the plurality of menu options having a common characteristic. In this example, the common characteristic is a phonetic unit and intonation but may be a phonetic unit alone, an intonation alone, a stroke used to draw an ideograph, a number of horizontal strokes, a number of vertical strokes, a number of total strokes, a stroke order, a radical, a part of speech, an ideograph, a kana, a diacritic, a classification of a part of an ideograph or other characteristic of a class of ideographs. The ten menu options shown in Figure 64 are Chinese ideographs each starting with the distinct sound "fú". Alternatively, the menu options may be sequences of graphic symbols including one or more kanji. In Figure 64 the Chinese ideographs are each displayed on the visible subregion of the associated selectable region and on the indicating region associated with the selectable region. The remaining two of the 12 selectable regions, (3624/3626) and (3644/3646), are associated with menu options for undo and for displaying more menu options, respectively. In the preferred embodiment, in response to the selection of the menu option for displaying more menu options, each of the selectable regions associated with a menu option starting with the distinct sound "fú" is associated with a menu option not previously displayed and the newly associated menu option replaces the old menu option on the display.

Resuming now with the description of the example of the preferred embodiment, a cross hair cursor (3686) is displayed in the circumscribed region (3680). Assuming the operator desires to select the menu option associated with selectable region (3608/3610), he turns his head to the left and the cross hair cursor (3686) moves to the left, responsive to the head movement, until the cross hair cursor hotspot intersects selectable region (3608/3610) and he maintains the location of the cross hair cursor hotspot on that selectable region for the selection threshold period. The menu option associated with selectable region (3608/3610) is selected and added to text (3684) displayed in the circumscribed region (3680), the general purpose computer system (2218) emits an audible beep indicating that selection has occurred and the displayed menu options, both on the indicating regions and the visible subregions, are removed from the display.

In the preferred embodiment, selection is made in accord with the Facilitated Dwell subaspect of the Dwell aspect of the invention, described above. Thus, the operator receives an indication of the progress of his selection by a change in appearance of the indicating region associated with the intersected selectable region. Alternatively, selection may be by intersection of a location indicated by the at least part of a cursor and a selectable region alone, by such an intersection

accompanied by a switch operation, for example, a depression of a space bar on the keyboard, or by other suitable means.

In accord with the Location Indication aspect of the invention, the operator sees the entire menu in the compact indicating regions and may discover the location of the selectable region associated with each menu option without having to visually scan all the visible subregions. In the preferred embodiment, the plurality of indicating regions may be moved to a different location on the display to avoid obstructing the area of the display showing most recently added graphic symbols or the area of the display where graphic symbols will soon be added. In accord with the Ideographic Language aspect of the invention, an operator may select from among many sequences of one or more ideographs without lifting either hand from the keyboard, thus speeding entry of single ideographs or sequences of ideographs in word processing systems for the Chinese, Japanese and Korean languages. Since, in the preferred embodiment, the selectable regions are located adjacent the edge of the display, a large rectangular region remains available on the display for the output of an application program. Further, if the selectable regions are located entirely outside the display, the indicating regions obstruct only a relatively small portion of the circumscribed region (3680), permitting the display of a sequences of ideographs for selection simultaneous with the display of previously selected ideographs, neither obstructing the operator's view of the other. If the general purpose computer system is coupled to a speech synthesizer and the ideographs are symbols of a symbol set, for example, the Blissymbolics Symbol Set, an illiterate operator, for example, a school child having impaired speech, may select symbols associated with words and those words may be spoken via the speech synthesizer.

Figure 65 illustrates a display and structures in accordance with an alternative embodiment of the Ideographic Language aspect of the invention. In this Figure, 18 selectable regions (3704/3706), (3708/3710), (3712/3714), (3716/3718), (3720/3722), (3724/3726), (3728/3730), (3732/3734), (3736/3738), (3740/3742), (3744/3746), (3748/3750), (3752/3754), (3756/3758), (3760/3762), (3764/3766), (3768/3770), (3772/3774) and (3776/3778) circumscribe region (3780) on the display (2112). The visible subregions of four of the 18 selectable regions abut each of the top, left and right edges of the display (2112). The visible subregions of six of the 18 selectable regions abut the bottom edge of the display (2112). The 18 indicating regions are located within the top half of region (3780). 12 of the 18 indicating regions are arranged in two columns of six indicating regions each. The column on the left is close to the visible subregions abutting the left edge of the display. The column on the right is close to the visible subregions abutting the right edge of the

display. Two of the 18 indicating regions are located between the top indicating regions in each of the left and right columns. The remaining four of the 18 indicating regions are located between the bottom indicating regions in each of the left and right columns. Each of the four indicating regions in the top row of indicating regions indicates the location of a respectively associated selectable region along the top edge of the display. Each of the six indicating regions in the bottom row of indicating regions indicates the location of a respectively associated selectable region along the bottom edge of the display. Each of the middle four indicating regions in each of the left and right columns of indicating regions indicates the location of a respectively associated selectable region along the left and right edge of the display. The 16 menu options shown in Figure 65 are Chinese ideographs each of which includes the radical kōu, a radical having the shape of a rectangle. Each ideograph is displayed on the visible subregion of the associated selectable region and on the indicating region associated with the selectable region. The remaining two of the 18 selectable regions, (3724/3726) and (3744/3746), are associated with menu options for undo and for displaying more menu options, respectively.

The indicating regions (3782) in Figure 65 are disproportionately large relative to the rest of Figure 65. They are approximately 1.5 times their proportionate size. They are represented as shown in Figure 65 in compliance with Patent Cooperation Treaty Rules requiring a minimum size for letters in figures.

Figure 66 illustrates a display and structures in accordance with an alternative embodiment of the Ideographic Language aspect of the invention. Figure 66 depicts a display (2112) of a computer system (2116) having thereon ten square indicating regions, (3801), (3803), (3805), (3807), (3809), (3811), (3813), (3815), (3817), and (3819), arranged in two columns of five indicating regions.

Each indicating region abuts an indicating region in the other column, the indicating region located above it, if any, and the indicating region located below it, if any. Each indicating region indicates the location of a respectively associated selectable region (not shown) outside the display. Assume that the operator is entering Chinese and uses a keyboard coupled to the computer system (2116) to enter the distinct sound "fú". On each of the indicating regions is then displayed an ideograph having with the distinct sound "fú". The operator, using a pointer coupled to the computer system (2116), points to the selectable region associated with the indicating region on which is displayed the desired ideograph. The selectable region is selected in response to a selection event, and, in this example, the associated menu option is input to a word processing program and appears on the display (2112).

Figure 67 illustrates a display and structures in accordance with an alternative embodiment of the Ideographic Language aspect of the invention. Figure 67 depicts a display (2112) of a computer system (2116) having thereon eight selectable regions (6701), (6703), (6705), (6707), (6709), (6711), (6713), and (6715), each located on the display (2112) adjacent the edge of the display (2112) and associated respectively with a menu option. Together the eight selectable region circumscribe region (6750) on the display. In Figure 67 each of eight menu options is displayed on its associated selectable region. Six of the eight menu options, associated with selectable regions (6703), (6705), (6707), (6701), (6715), and (6713) each represent a sequence of graphic symbols in the Japanese language. These sequences, in Romanized Japanese are respectively "hoka", "hoka ni", "hoka no", "hoka kara", "nanika hoka nomono", and "hoka demo nai ga". Each sequence includes the kanji "hoka" shown alone on selectable region (6703). The sequences are ordered by length, the shorter sequences on selectable regions on the left side of the display (2112) ordered by length from the top to the bottom of the display (2112), the longer sequences along the right side of the display (2112) ordered by length from the top to the bottom of the display (2112). The remaining two of the eight selectable regions, (6709) and (6711), are associated with menu options for displaying the previous and the next display of menu options, respectively. The menu option associated with a selectable region may be selected by a selection event.

The preferred embodiment of the Ideographic Language aspect of the invention will now be described in detail from an implementation perspective. Preferably, the Ideographic Language aspect of the invention is implemented by modifications to the access program (1206) described in the detailed description of the Perimeter Menu aspect of the invention, modified as described in the descriptions of the Facilitated Dwell subaspect and the Location Indication aspects of the invention. The modifications required for the Ideographic Language aspect of the invention are: (1) install on the general purpose computer system a font for the ideographic language of the embodiment; (2) at initialization time: (a) set the text of all labels for display on the selectable regions to null; (b) do not enable the cursor polling timer; and (c) hide the Windows® (1204) system cursor; (3) include in the main window processing procedure of the access program (1206) code to process WM_CHAR messages and, when a sequence of one or more WM_CHAR messages indicates a common characteristic: (a) lookup sequences or representations of sequences of one or more ideographs (hereinafter "sequences") having the common characteristic; (b) copy ten of the sequences to the labels; (c) set the Windows® (1204) system cursor to the cross hair cursor, set the cursor location to a predetermined location near an indicating region and show the Windows® (1204) system cursor; (d) set fPaint to TRUE for every state machine; (e) send

EV_RESET to every state machine; (f) display each sequence at the appropriate location in the indicating region; and (g) enable the cursor polling timer; and (4) add state processing to ST_SELECTED to: (a) set the text of all labels for display to null; (b) hide the Windows® (1204) system cursor; (c) erase all sequences from the indicating region; (d) disable the cursor polling timer; (e) set fPaint to TRUE for every state machine; (f) send EV_RESET to every state machine; and (g) insert the selected sequence into the work space.

In the above descriptions, there is shown and described only the preferred and certain alternate embodiments of each aspect of the invention, but, as aforementioned, it is to be understood that each aspect of the invention is capable of use in various other combinations and environments and is capable of changes or modifications within the scope of the inventive concepts as expressed herein.

Appendix I

Procedure: PocketFsm

```

5  /*****
   /*
   /* Procedure:    PocketFsm
   /*
   /* Description:  State Machine for processing events to
10 /*                selectable regions.
   /*
   /* Input Parameters:
   /*                pPocket    pointer to selectable region data
   /*                set        set
15 /*                Event      event to process
   /*
   *****/
   PocketFsm (pPocket, Event)
   {
20     BOOL          fInternalEvent      /* declaration of local
                                           boolean variable */

       set fInternalEvent to TRUE

25     while (fInternalEvent is TRUE)
       {
           set fInternalEvent to FALSE
           set pPocket->PreviousState to pPocket->State
           set pPocket->State to aPocketFsm[pPocket->State] [Event]
30
           switch (pPocket->State)
           {
               case ST_ILLEGAL_STATE:
               case ST_ERROR:

```

```
    turn off all timers
    log the error
    display an error message to the operator
    break
```

5

```
case ST_INITIAL:
```

```
    break
```

```
case ST_RESET:
```

10

```
    set time of selection to the current time
```

```
    if pPocket->Color is not equal to
```

```
    pPocket->InitialColor
```

```
        set pPocket->Color to pPocket->InitialColor
```

```
        set pPocket->fPaint to TRUE
```

15

```
    set pPocket->fInvert to FALSE
```

```
    break
```

```
case ST_LOW_TIDE:
```

```
    break
```

20

```
case ST_CREST_TIDE:
```

```
    break
```

```
case ST_BEGIN_LOCK:
```

25

```
    emit an audible beep
```

```
    set the system cursor location to the visible
```

```
    subregion's lockspot
```

```
    set the system cursor to null
```

```
    display the lock icon on the visible subregion's
```

30

```
    lockspot
```

```
        /* initialize counter
```

```
        for locking */
```

```
    set iLockCursor to cLockCursor
```

```
    break
```

```
case ST_LOCK:
    set the system cursor location to the visible
    subregion's lockspot
                                /* on lock counter
5                                expiration, */
                                /* transfer to the next
                                state */
    decrement iLockCursor by 1
    if iLockCursor equals 0
10        set Event to EV_NULL
        set fInternalEvent to TRUE
    break

case ST_END_LOCK:
15    erase the lock icon with white
    set the system cursor to the arrow cursor
    display the system cursor on the visible
    subregion' lockspot
    emit an audible beep
20                                /* paint selectable region
                                so that */
                                /* the white erasure of the
                                lock */
                                /* cursor icon is
25                                overwritten */
    set pPocket->fPaint to TRUE
    break

case ST_SELECTED:
30    emit an audible beep
    take the action appropriate upon selection of this
    selectable region, for example, sending data to an
    application program, sending a control sequence to
    a device coupled to the computer, or displaying
```



```
the selection
set pPocket->fInvert to TRUE
if appropriate, change the menu options associated
with various selectable regions and set fPaint to
5 TRUE for the state machines associated with those
selectable regions
set Event to EV_NULL
set fInternalEvent to TRUE
break

10
case ST_SELECT_AND_OUT:
    send EV_RESET then EV_MOVEMENT to all state
    machines, resetting them and indicating that the
    operator is moving the cursor
15 break

case ST_DECAY:
    /* set state to previous
    state */
20 /* in preparation for the
    next */
    /* state transition */
    set pPocket->State to pPocket->PreviousState
    decrement pPocket->Color by pPocket->Decrement,
25 but not below pPocket->InitialColor
    if pPocket->Color was changed
        set pPocket->fPaint to TRUE
        set fInternalEvent to TRUE
    if pPocket->Color was changed from a value greater
30 than or equal to pPocket->CrestTide to a value
    below pPocket->CrestTide
        set Event to EV_STEP_DOWN
    else
        set Event to EV_NULL
```

break

case ST_DWELL:

/* set state to previous

state */

/* in preparation for the
next */

/* state transition */

set pPocket->State to pPocket->PreviousState

increment pPocket->Color by pPocket->Increment,
but not above pPocket->Ceiling

if pPocket->Color was changed

set pPocket->fPaint to TRUE

set fInternalEvent to TRUE

if pPocket->Color was changed from a value below
pPocket->CrestTide to a value greater than or
equal to pPocket->CrestTide

set Event to EV_STEP_UP

else

set Event to EV_NULL

break

case ST_IDLE:

set the system cursor location to the center of
the display

set fInternalEvent to TRUE

set Event to EV_NULL

break

case ST_EBB_TIDE:

break

case ST_ENTRY:

set fInternalEvent to TRUE

```
        set Event to EV_NULL
        break

    case ST_DISCARD:

5          /* set state to previous
           state */
           /* for the next transition*/
        set pPocket->State to pPocket->PreviousState
        break

10

    case ST_EXIT:
        set Event to EV_NULL
        set fInternalEvent to TRUE
        if pPocket->fInterior equals TRUE
15          change the boundaries of the Windows® region
            having the handle pPocket->hRegion to those
            defined by the second array of points
            associated with this state machine
        set pPocket->fPaint to TRUE
20        send EV_RESET to the state machine having the
            index pPocket->iAdjacentPocket
        break

    default:
25        display error message
        break

    }
    /* end switch */
30  }
    /* end while */
    if pPocket->fPaint is equal to TRUE
        invalidate the entire client area
    }
```

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/* end PocketFsm */

Procedure: CreateEvent

```

/*****/
/*
5  /* Procedure:    CreateEvent    */
/*
/*
/* Description:    Examines movement of cursor and determines */
/*                  what events have occurred.                  */
/*
10 /* Input Parameters:
/*
/*          pEvent    pointer to an event data structure */
/*
/*                  for output
/*
/* Output:         A completed event data structure
/*
/*                  indicated by pEvent including:
15 /*
/*                  (1) an indication of whether the cursor hotspot */
/*                      intersects a selectable region
/*
/*                  (2) the index of the intersected selectable
/*                      region, if any
/*
/*                  (3) the event for the intersected selectable
20 /*                      region, if any
/*
/*                  (4) the event for all non-intersected
/*                      selectable regions
/*
/*
/*                  Updated variables indicate:
25 /*
/*                  (1) the previous location of the cursor hotspot */
/*
/*                  (2) the approximate time of the sampling of the
/*                      previous location of the cursor hotspot
/*
/*
/*****/
30 CreateEvent (pEvent)
{
    get current cursor hotspot location
    if there has been cursor hotspot movement since the last
    cursor location

```

```
sampling
    set time of previous cursor movement to time latest
    received
    WM_TIMER message was generated
5    if cursor hotspot has crossed out of a selectable region
        set event to EV_CROSS_OUT for the intersected
        selectable region and to EV_MOVEMENT for all other
        selectable regions
    else
10        if cursor hotspot intersects a selectable region
            if intersected selectable region's Color equals
            Ceiling
                set event to EV_CEILING for the intersected
                selectable region and to EV_DECAY for all
15                other selectable regions
            else
                set event to EV_DWELL for the intersected
                selectable region and to EV_DECAY for all
                other selectable regions
20        else
            set event to EV_MOVEMENT for all selectable
            regions
    else
        if cursor hotspot intersects a selectable region
25        if idle time exceeded
            set event to EV_IDLE_TIMEOUT for all selectable
            regions
        else
            if intersected selectable region's Color equals
30            Ceiling
                set event to EV_CEILING for the intersected
                selectable region and to EV_DECAY for all
                other selectable regions
            else
```

```
        set event to EV_DWELL for the intersected  
        selectable region and to EV_DECAY for all  
        other selectable regions
```

```
    else
```

```
5        set event to EV_DECAY for all selectable regions
```

```
        set the previous cursor hotspot location to the current  
        hotspot location
```

```
    }
```

```
10    /* end CreateEvent */
```

Claims

I claim:

1. For use with a human interface system wherein a body member of an operator may indicate a
5 first location on a surface, the surface including a display area, a method of selecting a sequence of one or more graphic symbols from a plurality of sequences of one or more graphic symbols, one or more sequences of the plurality of sequences including one or more ideographs, said method comprising the steps of:
10 displaying on the display area a plurality of selectable regions, the plurality of selectable regions together at least partially circumscribing a region on the display area, at least two of the selectable regions associated respectively with one sequence of the plurality of sequences, each of the plurality of sequences having a first common characteristic; and
15 in response to a selection event wherein the first location indicated by the body member at or near the time the selection event occurs intersects any one of the at least two selectable regions, selecting the sequence associated with the intersected selectable region.
2. The method of claim 1 wherein each of the sequences belongs to any one of the Chinese
20 language, Japanese language, Korean language, Picture Communication Symbols symbol set, Rebus symbol set, Picsyms symbol set, Pictogram Ideogram Communication Symbols symbol set, Yerkish symbol set, Blissymbolics symbol set, and a set of depictions of the signs of a manual sign language.
- 25 3. The method of claim 1 further comprising confining the first location indicated by the body member of the operator to the display area.
4. The method of claim 1 wherein the operator keeps at least five of his fingers, not including
30 either thumb, on the home row of a keyboard while moving the body member to indicate the first location on the surface.
5. The method of claim 1 wherein the first common characteristic includes any one of:
(a) a phonetic unit, including either one of a Chinese pronunciation and a Japanese pronunciation;

- (b) an intonation;
- (c) a stroke used to draw an ideograph;
- (d) a number of horizontal strokes;
- (e) a number of vertical strokes;
- 5 (f) a number of total strokes;
- (g) a stroke order;
- (h) a radical;
- (i) a part of speech;
- (j) an ideograph;
- 10 (k) a kana;
- (l) a diacritic;
- (m) a classification of a part of an ideograph;
- (n) a meaning; and
- (o) a meaning class.

15 6. The method of claim 1 wherein the body member of the operator is a body member other than the shoulder, arm, elbow, wrist, hand, finger, or thumb.

20 7. The method of claim 6 wherein the body member of the operator is the head of the operator.

8. The method of claim 1 wherein the displaying step further comprises displaying a first cursor on the display area at the first location indicated by the body member; and wherein the selecting step further comprises removing the first cursor from the display area.

25 9. The method of claim 8 wherein the selecting step further comprises displaying a second cursor at a predetermined location on the display area.

10 10. The method of claim 1 further comprising displaying on the display area one sequence of the plurality of sequences associated with one of the at least two selectable regions.

30 11. The method of claim 10 wherein the selecting step further comprises displaying a first cursor on the display area at a location on or near the displayed sequence.

12. The method of claim 10 wherein the step of displaying one sequence of the plurality of

sequences further comprises indicating the association of the displayed sequence with its associated selectable region.

- 5 13. The method of claim 12 wherein the indicating step further comprises displaying any part of either of:

- (a) the foreground of the displayed sequence; and
- (b) the background of the displayed sequence

in any one of:

- (1) a location;
- 10 (2) a size;
- (3) a shape;
- (4) a hue;
- (5) a brightness;
- (6) a contrast;
- 15 (7) a tone;
- (8) a dithering;
- (9) a fill; and
- (10) a font

associated with the associated selectable region.

- 20 14. The method of claim 1 further comprising selecting the first common characteristic from a plurality of common characteristics of ideographs.

- 25 15. The method of claim 1 wherein the selection event includes a switch operation.

16. The method of claim 1 wherein at least one sequence of the plurality of sequences includes one or more graphic symbols in addition to the graphic symbols of the at least one sequence representing the first common characteristic.

- 30 17. The method of claim 16 wherein the first common characteristic includes an ideograph and the additional graphic symbols of the at least one sequence include any one of:

- (a) a prefix;
- (b) an infix; and
- (c) a suffix;

which may be added to the ideograph.

18. The method of claim 1 wherein the at least two of the selectable regions are ordered responsive to any one of:

- (a) the frequency of use of the associated sequence in an ideographic language;
- (b) the frequency of use of the associated sequence in a predetermined operator's usage;
- (c) the recency of use of the associated sequence in a predetermined operator's usage;
- (d) the length of associated sequence;
- (e) the alphabetic order of the associated sequence; and
- (f) a second common characteristic.

19. For use with a human interface system including a keyboard wherein a body member of an operator may indicate a first location on a surface, the surface including a display area, a method of selecting a sequence of one or more graphic symbols from a plurality of sequences of one or more graphic symbols, one or more sequences of the plurality of sequences including one or more ideographs, said method comprising the steps of:

displaying on the display area a plurality of selectable regions, at least two of the selectable regions associated respectively with one sequence of the plurality of sequences, each of the plurality of sequences having a common characteristic;

moving the body member to indicate the first location on the surface while at least five of the operator's fingers, not including either thumb, remain on the home row of the keyboard; and

in response to a selection event wherein the first location indicated by the body member at or near the time the selection event occurs intersects any one of the at least two selectable regions, selecting the sequence associated with the intersected selectable region.

20. The method of claim 1 or 19 wherein the body member may indicate a second location on the surface and wherein the selection event includes the duration of a period of intersection equalling or exceeding a selection threshold period, the period of intersection starting in response to the first location intersecting any one of the selectable regions and ending in response to the second location intersecting the selectable region intersected by the first location.

21. For use with a human interface system wherein a body member of an operator may indicate a location outside a display area, a method of selecting a sequence of one or more graphic symbols from a plurality of sequences of one or more graphic symbols, one or more
5 sequences of the plurality of sequences including one or more ideographs, said method comprising the steps of:

at least partially delimiting a plurality of selectable regions outside the display area, at least two of the selectable regions associated respectively with one sequence of the plurality of
10 sequences, each of the plurality of sequences having a common characteristic; and

in response to a selection event wherein the location indicated by the body member at or near the time the selection event occurs intersects any one of the at least two selectable regions, selecting the sequence associated with the intersected selectable region.

- 15 22. The method of claim 21 wherein the body member of the operator is a body member other than either of the operator's eyes.

23. For use with a human interface system wherein a body member of an operator may indicate
20 successive locations on a surface, the surface including a display area, a method of selecting a sequence of one or more graphic symbols from a plurality of sequences of one or more graphic symbols, one or more sequences of the plurality of sequences including one or more ideographs, said method comprising the steps of:

25 at least partially delimiting a plurality of selectable regions, each of the selectable regions including an invisible subregion adjacent the display area and a visible subregion on the display area, the plurality of visible subregions together at least partially circumscribing a region on the display area, at least two of the selectable regions associated respectively with one sequence of the plurality of sequences, each of the plurality of sequences having a
30 common characteristic; and

responsive to the duration of a period of intersection equalling or exceeding a selection threshold period, the period of intersection starting in response to a starting location intersecting any one of the invisible subregions included in one of the at least two selectable

regions and ending in response to an ending location intersecting the invisible subregion intersected by the starting location, the starting and the ending locations each being one of the successive locations, selecting the sequence associated with the selectable region including the invisible subregion intersected by the starting location.

5

24. The method of claim 23 further comprising indicating the duration of a period of intersection, said period starting in response to the starting location and ending in response to an intermediate location intersecting the invisible subregion intersected by the starting location, the intermediate location being one of the successive locations occurring after the starting location.

10

25. For use with a human interface system wherein a body member of an operator may indicate successive locations on a surface, the surface including a display area, a method of selecting a sequence of one or more graphic symbols from a plurality of sequences of one or more graphic symbols, one or more sequences of the plurality of sequences including one or more ideographs, said method comprising the steps of:

15

displaying on the display area a plurality of selectable regions, the plurality of selectable regions together at least partially circumscribing a region on the display area, at least two of the selectable regions associated respectively with one sequence of the plurality of sequences, each of the plurality of sequences having a common characteristic; and

20

responsive to a quantity equalling or exceeding a selection threshold period, said quantity being a function of the durations of a first and a second period of intersection

25

said first period of intersection starting in response to a first starting location intersecting any one of the at least two selectable regions and ending in response to a first ending location intersecting the selectable region intersected by the first starting location,

30

said second period of intersection starting in response to a second starting location intersecting the selectable region intersected by the first starting location and ending in response to a second ending location intersecting the selectable region intersected by the first starting location.

the first starting location, the second starting location, the first ending location and the second ending location each comprising one of the successive locations.

selecting the sequence associated with the selectable region intersected by the first starting location.

26. The method of claim 25 further comprising increasing the selection threshold period responsive to the duration of an intermediate period of non-intersection of the selectable region intersected by the first starting location, said intermediate period of intersection starting in response to an intermediate starting location not intersecting the selectable region intersected by the first starting location and ending in response to an intermediate ending location not intersecting the selectable region intersected by the first starting location, the intermediate starting and the intermediate ending locations each comprising one of the successive locations and each occurring at the time or after the first ending location occurs and before or at the time the second starting location occurs.

27. The method of claim 26 further comprising indicating the duration of the intermediate period of non-intersection.

28. A method of selecting a sequence of one or more graphic symbols from a plurality of sequences of one or more graphic symbols, one or more sequences of the plurality of sequences including one or more ideographs, said method comprising the steps of:

displaying on a display a plurality of selectable regions, each of the selectable regions associated respectively with one sequence of the plurality of sequences, each of the plurality of sequences having a common characteristic;

receiving a movement related signal and moving a cursor on the display responsive thereto; and

selecting the sequence associated with the particular one of the plurality of selectable regions most nearly along a path indicated by a cursor location and the movement related signal in advance of an intersection of the cursor and said particular selectable region.

29. A method of selecting a sequence of one or more graphic symbols from a plurality of sequences of one or more graphic symbols, one or more sequences of the plurality of sequences including one or more ideographs, said method comprising the steps of:

5 displaying on a display a plurality of selectable regions, each of the selectable regions associated respectively with one sequence of the plurality of sequences, each of the plurality of sequences having a common characteristic;

10 receiving a movement related signal and moving a cursor on the display responsive thereto; and

responsive to:

- 15 (a) an intersection of the cursor and a selectable region; and
(b) a cursor path toward the intersected selectable region.

selecting the sequence associated with the intersected selectable region.

30. The method of claim 29 wherein the selecting step is further responsive to the duration of the period of the intersection equalling or exceeding a selection threshold period.

31. For use with a human interface system wherein a body member of an operator may indicate successive locations on a surface, the surface including a display area, a method of selecting an undo function, said method comprising the steps of:

25 first displaying on the display area a plurality of selectable regions, the plurality of selectable regions together at least partially circumscribing a region on the display area, at least two of the selectable regions associated respectively with one sequence of a plurality of sequences of graphic symbols, one or more sequences of the plurality of sequences including one or more ideographs and each having a common characteristic;

30 in response to a first selection event wherein a first one of the successive locations indicated by the body member at or near the time the first selection event occurs intersects any one of the at least two selectable regions, selecting the sequence associated with the intersected

selectable region;

performing a function with the selected sequence;

5 second displaying on the display area a selectable region associated with the undo function:
and

in response to a second selection event wherein a second one of the successive locations
indicated by the body member at or near the time the second selection event occurs intersects
10 the selectable region associated with the undo function, undoing the function performed with
the selected sequence.

32. A method of data entry in an ideographic language, said method comprising the steps of:

15 displaying on a display a plurality of selectable regions, the plurality of selectable regions
together at least partially circumscribing a region on the display, at least two of the selectable
regions associated respectively with one sequence of a plurality of sequences of graphic
symbols, one or more sequences of the plurality of sequences including one or more
ideographs and each having a common characteristic;

20 receiving a movement related signal and moving a cursor on the display responsive thereto:

responsive to a cursor path toward any one of the at least two selectable regions, changing a
selection threshold period associated or to be associated with said selectable region; and

25 responsive to the duration of a period of intersection of the cursor and said selectable region
equalling or exceeding the selection threshold period, entering into the at least partially
circumscribed region the sequence associated with said selectable region.

30 33. For use with a speech synthesis system including a speech synthesizer and a display, a
method of speaking comprising the steps of:

displaying on the display a plurality of selectable regions, the plurality of selectable regions
together at least partially circumscribing a region on the display, at least two of the selectable

regions associated respectively with one sequence of a plurality of sequences of graphic symbols, one or more sequences of the plurality of sequences including one or more ideographs and each having a common characteristic;

5 moving a cursor on the display responsive to the movement of a body member of an operator; and

in response to a selection event wherein the cursor at or near the time the selection event occurs intersects any one of the at least two selectable regions, speaking, by means of the
10 speech synthesizer, a word associated with the sequence associated with the intersected selectable region.

34. An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- 15 (a) display means for displaying on a display the plurality of menu options, each of the plurality of menu options associated respectively with a sound;
- (b) sound receiving means for receiving a sound signal;
- (c) match means for matching the received sound signal to any one of the plurality of sounds; and
- 20 (d) selection means for selecting the menu option associated with the matched sound.

35. The apparatus of claim 34 wherein one or more of the menu options represents a sequence of one or more letters and the sound associated with each of the one or more menu options is not a phonetic representation of the menu option.

25 36. The apparatus of claim 34 wherein each of the plurality of sounds is associated respectively with a sound indicator other than the displayed menu option.

30 37. The apparatus of claim 36 further comprising indication means for indicating the association of each sound indicator to the menu option associated with the sound associated with the sound indicator.

38. The apparatus of claim 37 wherein each of the sound indicators is outside the display.

39. The apparatus of claim 36 wherein one or more of the sound indicators includes a non-alphanumeric indicator.
40. The apparatus of claim 39 wherein the non-alphanumeric indicator includes any one of a hue indicator, a pitch indicator, a volume indicator, a sound duration indicator, a change in pitch indicator, a change in volume indicator, a shape indicator, and an object indicator.
41. For use with a general purpose computer system including a display, an apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:
- (a) display means for displaying on the display the plurality of menu options, each of the plurality of menu options associated respectively with a hue displayed intersecting or near the displayed menu option;
 - (b) sound receiving means for receiving a signal representing a sound;
 - (c) match means for matching the received sound to a name of any one of the plurality of hues; and
 - (d) selection means for selecting the menu option associated with the hue corresponding to the matched name.
42. The apparatus of claim 34 or 41 wherein the plurality of displayed menu options together at least partially circumscribe a region on the display.
43. An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:
- (a) a surface on which may be displayed the plurality of menu options, each of the plurality of menu options associated respectively with a sound indicator other than the displayed menu option;
 - (b) a sound matcher for matching a sound to any one of the plurality of sound indicators; and
 - (c) a selector for selecting the menu option associated with the matched sound indicator.
44. For use with a computer capable of executing an application program, a computer access device, said device comprising:
- (a) a menu hierarchy including a menu including a plurality of menu options, one or more of the menu options associated respectively with a sound which is not a phonetic

representation of the menu option and with a submenu including a plurality of submenu options, each of the submenu options associated respectively with a sound which is not a phonetic representation of the submenu option and with a sequence of one or more characters:

- 5 (b) sound receiving means for receiving a first and a second sound signal;
- (c) match means for matching the first sound signal to any one of the sounds associated with the one or more menu options and for matching the second sound signal to any one of the sounds associated with the submenu options; and
- 10 (d) input means, responsive to the match means matching the first and the second sound signals, for inputting to the application program the sequence of one or more characters associated with the submenu option associated with the sound matched by the second sound signal.

45. The computer access device of claim 44 further comprising:

- 15 (e) a display; and
- (f) means for displaying the one or more menu options on the display, and, responsive to the match means matching the first sound signal, displaying the submenu options on the display.

20 46. For use with a general purpose computer system including a display on which may be displayed a plurality of menu options; and including sound receiving means for receiving a sound signal, an apparatus for selecting a menu option from the plurality of menu options, said apparatus comprising:

- 25 (a) a medium readable by the general purpose computer system; and
- (b) a program, stored on the medium and executable by the general purpose computer system, for:
 - (1) displaying on the display the plurality of menu options, each of the plurality of menu options associated respectively with a sound which is not a phonetic representation of the menu option;
 - 30 (2) matching the received sound signal to any one of the plurality of sounds; and
 - (3) selecting the menu option associated with the matched sound.

47. The apparatus of claim 46 wherein the medium includes a random access memory.

48. The apparatus of claim 46 wherein the medium is coupled to the general purpose computer system.

49. The apparatus of claim 46 wherein the medium may be coupled to and uncoupled from the general purpose computer system.

50. The apparatus of claim 46 wherein the medium includes either one of a magnetic store and an optical store.

51. A speech synthesis system comprising:

(a) a display for displaying a plurality of menu options, each of the menu options associated respectively with a sound and with a sequence of one or more characters;

(b) sound receiving means for receiving successive sound signals;

(c) a speech synthesizer; and

(d) control means for

(1) matching one of the successive sound signals to any one of the plurality of sounds;

(2) repetitively

(I) selecting the sequence of one or more characters associated with the menu option associated with the matched sound; and

(ii) appending the selected sequence to at least one previously selected sequence; and

(3) speaking, by means of the speech synthesizer, the word spelled by the appended sequences.

52. A method of selecting a sequence of one or more graphic symbols from a plurality of sequences of one or more graphic symbols, one or more sequences of the plurality of sequences including one or more ideographs, said method comprising the steps of:

displaying on a display the plurality of sequences, each of the plurality of sequences having a common characteristic and each associated respectively with a sound indicator;

matching a sound to any one of the plurality of sound indicators; and

selecting the sequence of the plurality of sequences associated with the matched sound indicator.

53. The method of claim 52 wherein the sound is not a phonetic representation of the sequence associated with the matched sound indicator.

54. The method of claim 52 wherein the sound indicator is non-alphanumeric.

55. The method of claim 54 wherein the sound indicator is a hue.

56. The method of claim 52 further comprising the step of indicating the association of each of the plurality of sequences with the associated sound indicator.

57. The method of claim 52 wherein each of the sequences belongs to any one of the Chinese language, Japanese language, Korean language, Picture Communication Symbols symbol set, Rebus symbol set, Picsyms symbol set, Pictogram Ideogram Communication Symbols symbol set, Yerkish symbol set, Blissymbolics symbol set, and a set of depictions of the signs of a manual sign language.

58. An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- (a) a display area;
- (b) means for at least partially delimiting a plurality of selectable regions, each of the selectable regions outside the display area and each associated respectively with a menu option;
- (c) movement related signal receiving means for receiving a movement related signal indicating a location with respect to the display area; and
- (d) selection means for selecting, in response to a selection event associated with the selectable region intersected by the location, the menu option associated with the intersected selectable region.

59. The apparatus of claim 58 wherein the selection event includes a switch operation at or near the time the intersection occurs.

60. The apparatus of claim 58 further comprising means for indicating the menu option associated with each selectable region.
- 5 61. The apparatus of claim 58 further comprising means for indicating which one of the selectable regions is intersected by the location.
62. The apparatus of claim 58 further comprising location indication means for indicating the location of each selectable region.
- 10 63. The apparatus of claim 62 wherein the location indication means further comprises means for displaying each menu option on the display area, wherein the location of each displayed menu option indicates the location of the associated selectable region.
64. The apparatus of claim 62 where the location indication means includes means for displaying
15 at least part of each selectable region on the display area.
65. The apparatus of claim 58 wherein the selection event includes a switch operation; and wherein the selection means further comprises switch operation receiving means for receiving a signal indicating the switch operation.
- 20 66. The apparatus of claim 58 wherein the selection means is at least partially disabled in response to a first selection event.
67. The apparatus of claim 66 wherein the selection means, in response to a second selection
25 event, is restored to the functionality it had prior to the first selection event.
68. The apparatus of claim 58 wherein all or all but one of the selectable regions are partially delimited.
- 30 69. The apparatus of claim 68 wherein one of the selectable regions is completely delimited.
70. The apparatus of claim 68 further comprising a computer system including display means for displaying at least part of the output of an application program executable on the computer system in the region on the display area and wherein at least one of the menu options

represents an input to the application program.

71. An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- (a) a display area;
- (b) means for at least partially delimiting a plurality of selectable regions, each of the selectable regions outside the display area and each associated respectively with a menu option;
- (c) movement related signal receiving means for receiving a movement related signal indicating successive locations with respect to the display area; and
- (d) selection means, responsive to a first dwell event associated with any one of the selectable regions outside the display area, for selecting the menu option associated with the selectable region outside the display area associated with the first dwell event.

72. The apparatus of claim 71 further comprising a pointer, responsive to the movement of a body member of an operator other than either of the operator's eyes, for generating the movement related signal.

73. The apparatus of claim 71 wherein the selection means is responsive to a plurality of periods of intersection, each of two or more of the successive locations and the intersected selectable regions.

74. The apparatus of claim 71 wherein some of the selectable regions are not completely visible.

75. The apparatus of claim 71 wherein at most one of the selectable regions is adjacent the display area.

76. The apparatus of claim 71 wherein each of the successive locations is relative to a predetermined location on the display area or to a previous location of the successive locations.

77. The apparatus of claim 71 wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the durations of one or more successive periods of intersection of two or more of the successive locations and

one of the selectable regions; and wherein the selectable region associated with the first dwell event is the intersected selectable region.

5 78. The apparatus of claim 71 wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of:

(1) the durations of one or more successive periods of intersection of two or more of the successive locations and a first one of the selectable regions; and

(2) the durations of one or more successive periods of intersection of two or more of the successive locations and a second one of the selectable regions; and

10 wherein the selectable region associated with the first dwell event is the selectable region intersected by one of the successive locations when the first dwell event occurs.

79. The apparatus of claim 71 further comprising a plurality of selectable regions on the display area, each associated respectively with one of the selectable regions outside the display area;
15 and wherein the selection means is further operative, responsive to a second dwell event associated with any one of the selectable regions on the display area, to select the menu option associated with the selectable region outside the display area associated with the selectable region on the display area associated with the second dwell event.

20 80. The apparatus of claim 79 wherein the selection means is further operative, responsive to a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of:

(a) the durations of one or more successive periods of intersection of two or more of the successive locations and one of the selectable regions on the display area; and

25 (b) the durations of one or more successive periods of intersection of two or more of the successive locations and the selectable region outside the display area associated with the intersected selectable region on the display area;

to select the menu option associated with the selectable region outside the display area.

30 81. The apparatus of claim 79 wherein each of one or more of the selectable regions on the display area is adjacent the associated selectable region outside the display area.

82. The apparatus of claim 79 wherein each of one or more of the selectable regions on the display area indicates the location of the associated selectable region outside the display area.

83. The apparatus of claim 79 wherein the plurality of selectable regions on the display area together at least partially circumscribe a region on the display area.

5 84. The apparatus of claim 83 wherein the selection means further includes means for indicating the remaining dwell time required to select the intersected selectable region.

85. The apparatus of claim 83 wherein the movement related signal is responsive to the movement of a body member of an operator having impaired ability to sense the position of the body member and the apparatus further comprises tactile indication means for indicating
10 tactilely to the operator the position of the body member.

86. The apparatus of claim 83 wherein the selection means further includes means for indicating on the display area the location of one of the successive locations located outside the display
15 area.

87. The apparatus of claim 83 wherein the selection means further includes means for indicating on the display area the distance between one of the successive locations located outside the display area and the point on the display closest thereto.
20

88. In a human interface system including a display whereon a first cursor may be displayed and moved responsive to successive locations indicated by a movement related signal, an apparatus for selecting a menu option associated with an overshoot selectable region on the display, said apparatus comprising:

- 25 (a) means for displaying a plurality of selectable regions within a first polygon intersecting the display, each selectable region associated respectively with a menu option, each selectable region adjacent a side of the first polygon and the plurality of selectable regions together at least partially circumscribing a region on the display;
- (b) movement related signal receiving means for receiving the movement related signal
30 indicating the successive locations; and
- (c) control means for
- (1) moving the first cursor within the first polygon responsive to the successive locations indicated by the movement related signal;
 - (2) confining at least part of the first cursor to the first polygon; and

- (3) in response to a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the durations of one or more successive periods of intersection of the first cursor and one of the selectable regions, selecting the menu option associated with the intersected selectable region.

5

89. The apparatus of claim 88 wherein the first polygon is located on the display.

90. The apparatus of claim 89 wherein at least one of the selectable regions intersects the at least partially circumscribed region.

10

91. The apparatus of claim 89 wherein the control means is further operative to confine at least part of the first cursor to a second polygon on the display.

92. The apparatus of claim 91 wherein the control means is further operative to switch, responsive to an intersection of the first cursor and one of the selectable regions, from confining at least part of the first cursor to the first polygon to confining at least part of the first cursor to the second polygon .

15

93. The apparatus of claim 91 wherein the control means is further operative to switch, responsive to a distance between two of the successive locations, from confining at least part of the first cursor to the first polygon to confining at least part of the first cursor to the second polygon

20

94. The apparatus of claim 91 wherein the control means is further operative to switch, responsive to an angle indicated by three of the successive locations, from confining at least part of the first cursor to the first polygon to confining at least part of the first cursor to the second polygon

25

95. The apparatus of claim 91 wherein the first polygon intersects the second polygon.

30

96. The apparatus of claim 95 wherein the first polygon includes all of the area of the second polygon.

97. The apparatus of claim 89 wherein the selection of the control means is further responsive to the proximity of one of the successive locations indicated by the movement related signal to the location of the first cursor.

5 98. The apparatus of claim 89 wherein the selection of the control means is further responsive to the proximity of one of the successive locations indicated by the movement related signal to the intersected selectable region.

99. The apparatus of claim 89 wherein the first polygon has at least five sides.

10 100. The apparatus of claim 89 wherein at least one of the plurality of selectable regions is associated with an icon on the display.

101. The apparatus of claim 100 wherein the icon represents one of a sign of a manual sign
15 language, a location relative to a human body, a movement of a manual sign language a topic of conversation, a sentence, a desired direction of movement of a second cursor on the display, a sequence of one or more graphics including an ideograph, and a symbol of a symbol set.

20 102. An apparatus for selecting a submenu option from a menu hierarchy, said apparatus comprising:

(a) a display area;

(b) a menu comprising a plurality of menu options, at least one of the menu options associated with a submenu comprising a plurality of submenu options;

25 (c) means for at least partially delimiting:

(1) a plurality of first selectable regions, each of the first selectable regions associated respectively with one of the menu options and each of the first selectable regions including a first subregion adjacent the display area and a first subregion on the display area, the plurality of the first subregions on the display area together at least partially circumscribing a first region on the display area; and

30 (2) a plurality of second selectable regions, each of the second selectable regions associated respectively with one of the submenu options and each of the second selectable regions including a second subregion adjacent the display area and a

second subregion on the display area, the plurality of the second subregions on the display area together at least partially circumscribing a second region on the display area:

- (d) movement related signal receiving means for receiving a movement related signal indicating successive locations with respect to the display area; and
- (e) selection means for selecting, in response to a first dwell event, the menu option associated with the first selectable region intersected by one of the successive locations indicated by the movement related signal, the menu option being one of the menu options associated with a submenu, and for selecting, in response to a second dwell event, the submenu option associated with the second selectable region intersected by one of the successive locations indicated by the movement related signal.

103. The apparatus of claim 102 wherein one of the menu options represents a group of characters and wherein a first one of the submenu options represents a first one character of the group of characters.

104. The apparatus of claim 103 wherein each character of the group of characters has one of:

- (a) an extension at least a predetermined distance above the baseline of the group of characters;
- (b) an extension below the baseline of the group of characters;
- (c) lack of the characteristic described in (a); and
- (d) lack of the characteristic described in (b).

105. The apparatus of claim 103 wherein the distance on the display area between the first subregion on the display area associated with the menu option representing the group of characters and the second subregion on the display area associated with the submenu option representing the first one character of the group of characters is responsive to the frequency of use of the first one character.

106. The apparatus of claim 103 wherein:

- (a) a second one of the submenu options represents a second one character of the group of characters;
- (b) the first one character is more frequently used than the second one character; and

- (c) the distance on the display area between the first subregion on the display area associated with the menu option representing the group of characters and the second subregion associated with the submenu option representing the first one character of the group of characters is less than the distance on the display area between the first subregion on the display area associated with the menu option representing the group of characters and the second subregion on the display area associated with the submenu option representing the second one character of the group of characters.

107. The apparatus of claim 103 wherein the position of a character of the group of characters indicates the position of the second subregion on the display area associated with the submenu option representing the first one character of the group of characters.

108. An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- (a) a surface;
- (b) means for delimiting a plurality of selectable regions on the surface, each of the selectable regions associated respectively with a menu option, the plurality of selectable regions together at least partially circumscribing a region on the surface;
- (c) a pointer, responsive to the movement of a one of an operator's limbs, digits and head, for indicating successive locations on the surface; and
- (d) selection means for selecting, in response to a dwell event, the menu option associated with the selectable region intersected by one of the successive locations indicated by the pointer.

109. An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- (a) means for displaying a plurality of selectable regions on a display area, each of the selectable regions associated respectively with a menu option, the plurality of selectable regions together at least partially circumscribing a region on the display area;
- (b) movement related signal receiving means for receiving a movement related signal indicating successive locations on the surface; and
- (c) in response a quantity equalling or exceeding a predetermined quantity, the quantity being a function of the durations of a plurality of successive periods of intersection of

two or more of the successive locations and one of the selectable regions. selection means for selecting the menu option associated with the intersected selectable region.

110. An apparatus for selecting an option from a menu, said apparatus comprising:

- 5 (a) cursor movement means for receiving a movement related signal and for moving a cursor on a display responsive to the received movement signal;
- (b) delimit means for delimiting on the display a first plurality of regions and a second plurality of selectable regions. each of the second plurality of selectable regions associated respectively with a menu option; the first plurality of regions together at
- 10 least partially circumscribing a first region on the display; and
- (c) selection means, responsive only to an intersection of the cursor and a first one of the first plurality of regions and thereafter to a first selection event associated with one of the second plurality of selectable regions, for selecting the menu option associated with the selectable region associated with the first selection event.

15 111. The apparatus of claim 110 further comprising means for receiving a switch operation signal; and wherein the delimit means includes means for displaying the first plurality of regions responsive to the received switch operation signal.

20 112. The apparatus of claim 110 wherein the second plurality of selectable regions together at least partially circumscribing the first region on the display.

113 The apparatus of claim 110 further comprising a third plurality of selectable regions, each of the third plurality of selectable regions associated respectively with a menu option; and

25 wherein the selection means is further responsive to an intersection of the cursor and a second one of the first plurality of regions and thereafter to a second selection event associated with one of the third plurality of selectable regions, for selecting the menu option associated with the selectable region associated with the second selection event.

30 114. The apparatus of claim 110 wherein the selection means includes means for receiving a switch operation signal; and wherein the first selection event includes:

- (1) an intersection of the cursor and the selectable region associated with the second selection event; and
- (2) at or near the time the intersection occurs, receipt of the switch operation signal.

115. In a human interface system wherein a body member of an operator may indicate successive locations with respect to a display, a menu option selector for selecting a menu option from a plurality of menu options, said menu option selector comprising:

- 5 (a) the display having thereon a first plurality of selectable regions, each of the first plurality of selectable regions associated respectively with one of the menu options;
- (b) means for at least partially delimiting a second plurality of selectable regions, each of the second plurality of selectable regions located outside the display and each associated respectively with one of the first plurality of selectable region;
- 10 (c) in response to a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of:
 - (1) the durations of one or more successive periods of intersection of two or more of the successive locations and one of the selectable regions on the display area;
and
 - 15 (2) the durations of one or more successive periods of intersection of two or more of the successive locations and the selectable region outside the display area
associated with the one of the selectable regions on the display area;
a selector for selecting the menu option associated with the one of the selectable
regions on the display area.

20 116. The apparatus of claim 115 wherein the plurality of the subregions on the display together at least partially circumscribing a region on the display.

25 117. In a human interface system wherein a body member of an operator may indicate a location on a surface, a menu option selector comprising:

- 30 (a) the surface including a display area, the display area having thereon a plurality of selectable regions, each of the selectable regions associated respectively with a menu option, the plurality of selectable regions together at least partially circumscribing a region on the display area;
- (b) a clipper for generating, in response to the location indicated by the body member of the operator indicating a location outside the display area, a clipped location indicative of a location on the display area; and
- (c) a selector for selecting, in response to a selection event, the menu option associated with the selectable region intersected by the clipped location.

118. In a human interface system wherein a body member of an operator may indicate a location on a surface, a menu option selector comprising:

- 5 (a) the surface including a display area, the display area having thereon a plurality of selectable regions, each of the selectable regions associated respectively with a menu option, the plurality of selectable regions together at least partially circumscribing a region on the display area;
- (b) a confiner for confining the location indicated by the body member of the operator to the display area; and
- 10 (c) a selector for selecting, in response to a selection event, the menu option associated with the selectable region intersected by the location indicated by the body member of the operator.

119. The menu option selector of claim 117 or 118 wherein each of the plurality of selectable regions is adjacent an edge of the display area.

15

120. In a human interface system wherein a body member of an operator may indicate successive locations on a surface, a menu option selector comprising:

- 20 (a) a detector area on the surface and including a plurality of selectable regions, each of the selectable regions associated respectively with a menu option;
- (b) a confiner for confining the location indicated by the body member of the operator to the detector area; and
- (c) a selector for selecting, in response to a dwell event associated with any one of the
- 25 selectable regions, the menu option associated with the selectable region associated with the dwell event.

121. The menu option selector of claim 120 wherein each of the plurality of selectable regions is adjacent an edge of the detector area.

30

122. For use with a general purpose computer system including a display on which a cursor may be displayed, the general purpose computer system being capable of executing an application program, an apparatus comprising:

- (a) a medium readable by the general purpose computer system; and

- (b) a program, stored on the medium and executable by the general purpose computer system, for:
- (1) displaying a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon, one or more of the selectable regions each associated respectively with a sequence of one or more characters, the plurality of selectable regions together at least partially circumscribing a region on the display;
 - (2) receiving a movement related signal and moving at least part of the cursor only within the polygon responsive to the movement related signal; and
 - (3) in response to a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the durations of one or more successive periods of intersection of the cursor and one of the one or more selectable regions, inputting the sequence of one or more characters associated with the intersected selectable region to the application program.

123. A data entry system including a computer system on which may be executed an application program, said data entry comprising:

- (a) the computer system including a display;
- (b) a pointer selected from the group consisting of a (1) mouse; (2) trackball; (3) joystick; (4) stylus and graphics tablet; (5) lightpen; (6) thumb wheel; (7) touch screen; (8) head pointer; and (9) intraoral pointer, the pointer coupled to the computer system; and
- (c) program means executable on the computer system for:
 - (1) displaying a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon, the plurality of selectable regions together at least partially circumscribing a region on the display;
 - (2) moving a cursor within the polygon responsive to movement of the pointer; and
 - (3) in response to a selection event and an intersection of the cursor and a selectable region associated with an input for the application program, inputting the input to the application program.

124. A computer access system for an operator having impaired motor capability, said computer access system including a computer system on which may be executed a computer program, said computer access system comprising:

- (a) the computer system including a display:
- (b) program means executable on the computer system for:
 - (1) displaying a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon, the plurality of selectable regions together at least partially circumscribing a region on the display;
 - (2) receiving a movement related signal and moving at least part of a cursor only within the polygon responsive to the movement related signal; and
 - (3) in response to a selection event and an intersection of the cursor and a selectable region associated with an input for the computer program, inputting the input to the computer program.

125. A speech synthesis system comprising:

- (a) a display on which may be displayed a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon and one or more of the selectable regions associated respectively with a sequence of one or more characters, the plurality of selectable regions together at least partially circumscribing a region on the display;
- (b) a speech synthesizer; and
- (c) control means for:
 - (1) receiving a movement related signal and moving a cursor within the polygon responsive to the movement related signal;
 - (2) repetitively, in response to a selection event and an intersection of the cursor and one of the selectable regions associated with one of the one or more sequences of one or more letters, appending the sequence associated with the intersected selectable region to at least one previously selected sequence; and
 - (3) speaking, by means of the speech synthesizer, the word spelled by the appended sequences.

126. A device controller comprising:

- (a) means for displaying a plurality of selectable regions within a polygon on a surface, each selectable region adjacent a side of the polygon and each selectable region associated respectively with a device control function, the plurality of selectable regions together at least partially circumscribing a region of the polygon;

- (b) signal generating means coupled to a device for generating a device control signal; and
- (c) control means for:

- (1) receiving a movement related signal and moving at least part of a cursor only within the polygon in response to the received movement related signal; and
- (2) in response to a selection event, generating a device control signal corresponding to the device control function associated with the one of the plurality of selectable regions intersected by the cursor.

127. The device controller of claim 126 wherein the device includes any one of a wheelchair, a household appliance, an appliance for use in an office, a workstation, a robot, and a computer peripheral.

128. For use with a surface comprising a display area, a method of selecting a menu option from a plurality of menu options, said method comprising the steps of:

at least partially delimiting a plurality of selectable regions, each of the selectable regions associated respectively with a menu option and each of the selectable regions including an invisible subregion outside the display area and a visible subregion on the display area, the plurality of visible subregions together at least partially circumscribing a region on the display area;

receiving a movement related signal indicating successive locations with respect to the display area; and

selecting, in response to a dwell event associated with one of the selectable regions, the menu option associated with the selectable region associated with the dwell event.

129. For use with a human interface system wherein a body member of an operator may indicate successive locations on a surface, the surface including a display area, the display area having thereon a plurality of selectable regions, each of the selectable regions associated respectively with a menu option and the plurality of selectable regions together at least partially circumscribing a region on the display area, a method of selecting a menu option from a plurality of menu options, said method comprising the steps of:

confining each of the successive locations to the display area: and

selecting, in response to a dwell event associated with one of the selectable regions, the menu option associated with the selectable region associated with the dwell event.

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130. A method of speaking using a speech synthesis system including a display and a speech synthesizer, said method comprising the steps of:

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displaying a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon and one or more of the selectable regions associated respectively with a sequence of one or more characters, the plurality of selectable regions together at least partially circumscribing a region on the display;

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receiving a movement related signal and moving at least part of a cursor only within the polygon responsive to the movement related signal;

repetitively:

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(i) in response to a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the durations of one or more successive periods of intersection of the cursor and one of the one or more selectable regions, selecting the sequence associated with the intersected selectable region; and

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(ii) appending the selected sequence to at least one previously selected sequence; and

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speaking, by means of the speech synthesizer, the word spelled by the appended sequences.

131. A method of inputting data to a computer program for an operator having impaired motor capability, said method comprising the steps of:

displaying a plurality of selectable regions within a polygon on a display, each

selectable region adjacent a side of the polygon and each selectable region associated respectively with an input for the computer program, the plurality of selectable regions together at least partially circumscribing a region on the display:

5 receiving a movement related signal and moving at least part of a cursor only within the polygon responsive to the movement related signal; and

in response to a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the durations of one or more successive periods of
10 intersection of the cursor and one of the selectable regions, inputting the input associated with the intersected selectable region to the computer program.

132. An apparatus for indicating dwell time comprising:

- 15 (a) a surface with respect to which a region may be at least partially delimited;
- (b) movement receiving means for receiving a movement related signal indicating a first location intersecting the region and, at a later time, a second location intersecting the region; and
- (c) indicating means for indicating at least the difference between the time the second location occurs and the time the first location occurs.

20 133. The apparatus of claim 132 wherein the indicating means includes means for determining the difference between the time the second location occurs and the time the first location occurs.

25 134. The apparatus of claim 132 wherein the indicating means includes an indicator and means for modifying the appearance of the indicator.

135. The apparatus of claim 132 wherein the region intersects the surface.

30 136. The apparatus of claim 132 wherein the region is adjacent the surface.

137. The apparatus of claim 132 wherein the movement related signal further indicates, at a time later than the time the second location occurs, a third location not intersecting the region and the indicating means is further operative to indicate the non-intersection of the third location and the region.

138. The apparatus of claim 132 wherein the movement related signal further indicates, at a time later than the time the second location occurs, a third location not intersecting the region and, at a later time, indicates a fourth location not intersecting the region and the indicating means is further operative to indicate at least the difference between the time the fourth location occurs and the time the third location occurs.

139. The apparatus of claim 132 wherein the indicating means includes means for producing an output signal which varies in at least one way as the difference between the time the second location occurs and the time the first location occurs increases and varies in at least the opposite way as the difference between the time the fourth location occurs and the time the third location occurs increases.

140. An apparatus for indicating dwell time comprising:

- (a) a pointer;
- (b) a detector; and
- (c) an indicator for indicating at least the duration of a period the pointer indicates the detector.

141. The apparatus of claim 140 wherein the indication of the duration of the period of detection includes a visible signal.

142. The apparatus of claim 140 wherein the indication of the duration of the period of detection includes an audible signal.

143. The apparatus of claim 140 wherein the indication of the duration of the period of detection includes a tactile signal.

144. An apparatus for indicating the remaining dwell time required to select a selectable region, said apparatus comprising:

- (a) a surface with respect to which the selectable region may be at least partially delimited;
- (b) movement receiving means for receiving a movement related signal indicating successive locations with respect to the surface; and

(c) indicating means for modifying in a first manner the appearance of a first indicating region on the surface responsive to a period of intersection of two or more of the successive locations and the selectable region not equalling or exceeding a predetermined period and for modifying in a second manner the appearance of a second indicating region on the surface responsive to a period of intersection of two or more of the successive locations and the selectable region equalling or exceeding the predetermined period.

145. The apparatus of claim 144 wherein the modification in the first manner includes a slight modification and the modification in the second manner includes a marked modification.

146. The apparatus of claim 144 wherein the modification in the first manner includes a modification in brightness.

147. The apparatus of claim 144 wherein the modification in the second manner includes a modification in hue.

148. The apparatus of claim 144 wherein the first indicating region intersects the second indicating region.

149. The apparatus of claim 144 wherein one of the first and second indicating regions intersects the selectable region.

150. The apparatus of claim 144 wherein one of the first and second indicating regions is coterminous with the selectable region.

151. An apparatus for indicating dwell time comprising:

- (a) a surface with respect to which a plurality of regions may be at least partially delimited;
- (b) movement receiving means for receiving a movement related signal indicating a first location intersecting any one of the plurality of regions and, at a later time, a second location intersecting the region intersected by the first location; and
- (c) a plurality of indicators, each associated respectively with a region, for indicating at

least the difference between the time the second location occurs and the time the first location occurs.

152. The apparatus of claim 151 wherein each indicator is adjacent its associated region.

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153. The apparatus of claim 151 wherein each indicator intersects its associated region.

154. An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

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- (a) a surface with respect to which a plurality of selectable regions may be at least partially delimited, each selectable region associated respectively with a menu option;
- (b) movement receiving means for receiving a movement related signal indicating successive locations with respect to the surface; and
- (c) selection means for selecting, in response to a dynamic dwell event, the menu option associated with the selectable region intersected by the location of the successive locations whose occurrence triggers the dynamic dwell event.

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155. In a human interface system wherein a body member of an operator may indicate successive locations with respect to a surface, a menu option selector comprising:

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- (a) the surface with respect to which a selectable region may be at least partially delimited, the selectable region associated with a menu option;
 - (b) a detector for detecting the successive locations; and
 - (c) responsive to:
 - (1) the duration of a first period during which two or more of the successive locations intersect the selectable region;
 - (2) the duration of a second period, occurring after the first period, during which two or more of the successive locations do not intersect the selectable region; and
 - (3) the duration of a third period, occurring after the second period, during which two or more of the successive locations intersect the selectable region;
- a selector for selecting the menu option.

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156. A device controller comprising:

- (a) display means for displaying a plurality of selectable regions on a surface, each selectable region associated respectively with a device control function;

- (b) movement receiving means for receiving a movement related signal indicating successive locations on the surface;
- (c) indicating means for indicating at least the duration of a period of intersection of two or more of the successive locations indicated by the movement related signal and a selectable region; and
- (d) initiation means, responsive to a dwell event, for initiating the control function associated with the intersected selectable region.

157. The device controller of claim 156 further comprising a controlled device, responsive to the initiation means, for performing the device control function.

158. The device controller of claim 157 wherein the controlled device includes one of a household appliance and a motorized wheelchair.

159. A computer access device for an operator having impaired motor control, said device comprising:

- (a) a computer system, including a display on which may be displayed a plurality of selectable regions, each of the selectable regions associated respectively with a sequence of one or more characters, and on which display a moveable cursor may be displayed and then moved responsive to a movement related signal, the computer system being further capable of executing an application program operative to accept signals representing any of the plurality of sequences of one or more characters; and
- (b) an access program, for execution on the computer system, for indicating at least the duration of a period of intersection of the cursor and any one of the one or more selectable regions and for inputting to the application program signals representing the sequence of one or more characters associated with the intersected selectable region in response to the period of intersection of the cursor and the intersected selectable region equalling or exceeding a predetermined period.

160. For use with a general purpose computer system including a display with respect to which may be at least partially delimited a plurality of selectable regions, each of the selectable regions associated respectively with a sequence of one or more characters, wherein the general purpose computer system is capable of receiving a movement related signal indicating successive locations with respect to the display, and wherein the general purpose

computer system is capable of executing an application program:

- (a) a medium readable by the general purpose computer system; and
- (b) a program, stored on the medium and executable by the general purpose computer system, for:
 - (1) indicating at least the duration of a period of intersection of two or more of the successive locations and any one of the selectable regions; and
 - (2) passing to the application program the sequence of one or more characters associated with the intersected selectable region in response to the duration of the period of intersection equalling or exceeding a predetermined period.

161. For use with a processing unit,

- (a) said processing unit coupled to a display on which may be displayed a plurality of selectable regions, each region associated respectively with a sequence of one or more characters;
- (b) said processing unit being capable of receiving a movement related signal indicating successive locations on the display;
- (c) said processing unit being capable of executing an application program;

an access program, executable on the processing unit, for an operator having impaired motor control, said access program operative to indicate at least the duration of a period of intersection of two or more of the successive locations and an intersected selectable region and to pass to the application program the sequence of one or more characters associated with the intersected selectable region in response to the duration of the period of intersection equalling or exceeding a predetermined period.

162. The computer access device of claim 161 wherein the access program and the application program include at least some common code.

163. For use with a computer system, a computer access device for an operator having impaired motor control, said device comprising:

- (a) a pointer;
- (b) a detector associated with a sequence of one or more characters;
- (c) an indicator for indicating at least the duration of a period the pointer indicates the detector; and

- (d) a processing unit coupled to the computer system for inputting to the computer system, in response to a dwell event, signals representing the sequence of one or more characters associated with the detector.

5 164. A speech synthesis system comprising:

- (a) a display with respect to which may be delimited a plurality of selectable regions, each of the selectable regions associated respectively with a sequence of one or more characters;
- (b) a speech synthesizer; and
- 10 (c) control means for
- (1) receiving a movement related signal indicating successive locations with respect to the surface;
- (2) repetitively
- 15 (a) indicating the duration of a first period of intersection of two or more of the successive locations and a first one of the selectable regions; and
- (b) in response to the duration of a second period of intersection of two or more of the successive locations and the first one of the selectable regions equalling or exceeding a predetermined period, appending the sequence associated with the first one of the selectable regions to at least one
- 20 previously selected sequence; and
- (3) speaking, by means of the speech synthesizer, the word spelled by the appended sequences.

165. A speech synthesis system comprising:

- 25 (a) a display on which may be displayed a plurality of selectable regions, each selectable region associated respectively with a sequence of one or more characters;
- (b) a speech synthesizer; and
- (c) control means for:
- (1) receiving a movement related signal indicating:
- 30 (A) a first location intersecting any one of the plurality of selectable regions;
- (B) at a time after the first location occurs, a second location intersecting the selectable region intersected by the first location;
- (C) at a time after the second location occurs, a third location not intersecting the selectable region intersected by the first location;

- (D) at a time after the third location occurs, a fourth location not intersecting the selectable region intersected by the first location;
- (E) at a time after the fourth location occurs, a fifth location intersecting the selectable region intersected by the first location; and
- (F) at a time after the fifth location occurs, a sixth location intersecting the selectable region intersected by the first location;

(2) repetitively:

(A) responsive to the difference between the time the second location occurs and the time the first location occurs, increasing the brightness of the selectable region;

(B) responsive to the difference between the time the fourth location occurs and the time the third location occurs, decreasing the brightness of the selectable region; and

(C) responsive to a quantity that is a function of:

(i) the difference between the time the second location occurs and the time the first location occurs;

(ii) the difference between the time the fourth location occurs and the time the second location occurs; and

(iii) the difference between the time the sixth location occurs and the time the fifth location occurs;

equalling or exceeding a predetermined quantity, appending the sequence associated with the selectable region to at least one previously selected sequence; and

(3) speaking, by means of the speech synthesizer, the word spelled by the appended sequences.

166. A data entry system comprising:

- (a) a display having thereon a plurality of selectable data entry items and a region for indicating the number of units of the data entry item selected;
- (b) a plurality of detectors, each associated respectively with one of the selectable data entry items;
- (c) a pointer for emitting signals directed at the data entry items; and
- (d) control means for controlling the operation of said data entry system, the control

means including:

- (1) first indicating means for producing signals in response to the signals falling on the detectors, said first indicating means giving a first indication of the period of time that the pointer has been directed to a first one of the data entry items;
- (2) second indicating means for producing signals in response to the signals falling on the detectors, said second indicating means giving a second indication that the pointer has been directed to a second one of the data entry items for at least a predetermined period of time and that the second one of the data entry items is selected for entry into the data entry system; and
- (3) third indicating means for indicating in the region the number of units of the data entry item selected.

167. A order entry system comprising:

- (a) a display having thereon a plurality of selectable order entry items, a first region for indicating the number of units of the order entry item selected and a second region for indicating the total monetary value of the units selected;
- (b) a plurality of detectors, each associated respectively with one of the selectable order entry items;
- (c) a pointer for emitting signals directed at the order entry items; and
- (d) control means for controlling the operation of said order entry system, the control means including
 - (1) first indicating means for producing signals in response to the signals falling on the detectors, said first indicating means giving a first indication of the duration of the period that the pointer has been directed to a first one of the order entry items;
 - (2) second indicating means for producing signals in response to the signals falling on the detectors, said second indicating means giving a second indication that the pointer has been directed to a second one of the order entry items for at least a predetermined period of time and that the second one of the order entry items is selected for entry into the order entry system;
 - (3) third indicating means for indicating in the first region the number of units of the order entry item selected;
 - (4) totaling means for totaling the monetary value of the units selected; and
 - (5) fourth indicating means for indicating in the second region the total monetary

value of the units selected.

168. The order entry system of claim 167 wherein the first indicating means further includes third
indicating means for giving a third indication of the duration of the period that the pointer is
not directed to an order entry item to which it was previously directed.

169. The order entry system of claim 167 wherein the display further includes a pictorial
representation for at least some of the order entry items and wherein the detectors are located
within each pictorial representation.

170. The order entry system of claim 169 wherein the pictorial representation is in the form of a
food item at a fast-food restaurant.

171. The order entry system of claim 167 wherein the pointer includes:

- (a) an infrared light source; and
- (b) a lens for producing a narrow beam of light in cooperation with the infrared light
source.

172. The order entry system of claim 167 further comprising a stationary housing for housing the
pointer, said housing positioned relative to the display to enable a person using the order
entry system and seated in a vehicle to pick up the pointer, use it, and return it to the
stationary housing while seated in the vehicle.

173. An apparatus for selecting a menu option from a plurality of menu options, said apparatus
comprising:

- (a) a surface including a plurality of detectors each associated respectively with a menu
option;
- (b) a pointer operative to emit energy detectable by each of the plurality of detectors; and
- (c) responsive to:
 - (1) the duration of a first period during which a particular detector detects energy
emitted by the pointer above a first threshold;
 - (2) the duration of a second period, occurring after the first period, during which the
particular detector does not detect energy emitted by the pointer above a second
threshold; and

- (3) the duration of a third period, occurring after the second period, during which the particular detector detects energy emitted by the pointer above a third threshold;
a selector for selecting the menu option associated with the particular detector.

5 174. The apparatus of claim 173 wherein the selector selects the menu option associated with the particular detector in response to the sum of a multiple of the duration of the first period and a multiple of the duration of the third period minus a multiple of the duration of the second period equalling or exceeding a predetermined quantity.

10 175. An apparatus for inputting words, said apparatus comprising:

- (a) a display with respect to which may be delimited a selectable region associated with a word;
- (b) word receiving means for receiving a signal representing the word; and
- (c) control means for:

- 15 (1) receiving a movement related signal indicating successive locations with respect to the surface;
- (2) indicating the duration of a period of intersection of two or more of the successive locations and the selectable region; and
- (3) inputting, in response to the period of intersection equalling or exceeding a
20 predetermined period, the signal representing the word to the word receiving means.

176. The apparatus of claim 175 wherein the word belongs to an ideographic language.

25 177. A method of indicating the remaining dwell time required to select a selectable region, said method comprising the steps of:

displaying the selectable region on a surface;

30 receiving a movement related signal indicating a first location intersecting the selectable region and, at a time after the first location occurs, a second location intersecting the selectable region; and

indicating the difference between the time the second location occurs and the time the first

location occurs.

178. The method of claim 177 further comprising the steps of:

5 receiving a movement related signal indicating, at a time after the time the second location occurs, a third location not intersecting the selectable region; and

indicating the non-intersection of the third location and the selectable region.

10 179. The method of claim 178 further comprising the steps of:

receiving a movement related signal indicating, at a time after the time the third location occurs, a fourth location not intersecting the selectable region; and

15 indicating the difference between the time the fourth location occurs and the time the third location occurs.

180. In a human interface system including a surface on which may be displayed a cursor whose movement is responsive to a first movement related signal, and with respect to which surface
20 may be at least partially delimited a plurality of selectable regions, each of the plurality of selectable regions associated respectively with a menu option, an apparatus for selecting any one of the plurality of menu options, said apparatus comprising:

- (a) movement related signal receiving means for receiving the first movement related signal; and
- 25 (b) selection means for selecting the menu option associated with the particular one of the plurality of selectable regions most nearly along a first cursor path indicated by a first cursor location and the first movement related signal in advance of an intersection of the cursor and the particular selectable region.

30 181. The apparatus of claim 180 wherein the movement related signal receiving means is further operative to receive a second movement related signal occurring subsequent to the first movement related signal; wherein the selection means is further operative to select the menu option associated with the specific one of the plurality of selectable regions most nearly along a second cursor path indicated by a second cursor location and the second movement

related signal in advance of an intersection of the cursor and the specific selectable region; wherein the first and second cursor paths are parallel; and wherein the particular selectable region is not the specific selectable region.

- 5 182. In a human interface system including a surface on which may be displayed a cursor whose movement is responsive to a first movement related signal, and with respect to which surface may be at least partially delimited a plurality of selectable regions, each of the plurality of selectable regions associated respectively with a menu option, an apparatus for selecting any one of the plurality of menu options, said apparatus comprising:
- 10 (a) movement related signal receiving means for receiving the first movement related signal; and
- (b) selection means for selecting the menu option associated with the particular one of the plurality of selectable regions most nearly along a first cursor path in response to an intersection of the cursor and said particular selectable region.
- 15 183. The apparatus of claim 180 or 182 further comprising means for indicating which one of the plurality of selectable regions is most nearly along the first cursor path.
184. The apparatus of claim 180 or 182 wherein the surface includes a display area and each of the plurality of selectable regions is adjacent an edge of the display area.
- 20 185. The apparatus of claim 180 or 182 wherein the plurality of selectable regions together at least partially circumscribes an area on the surface.
- 25 186. An apparatus for selecting an option from a menu, said apparatus comprising:
- (a) means for at least partially delimiting a plurality of selectable regions with respect to a surface, each of the plurality of selectable regions associated respectively with a menu option;
- (b) movement related signal receiving means for receiving a movement related signal; and
- 30 (c) control means for:
- (1) moving a cursor on the surface in response to the received movement related signal;
- (2) changing a selection threshold period responsive to a cursor path;
- (3) detecting an intersection of the cursor and any one of the plurality of selectable

regions; and

- (4) in response to the period of the intersection equalling or exceeding the selection threshold period, selecting the menu option associated with the intersected selectable region.

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187. The apparatus of claim 186 wherein the control means is further operative to indicate the changed length of the selection threshold period.

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188. The apparatus of claim 186 wherein one of the plurality of selectable regions has previously been selected and the amount of change to the selection threshold period varies in response to which one of the selectable regions has been previously selected.

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189. The apparatus of claim 186 wherein the changed selection threshold period equals or exceeds a predetermined period.

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190. The apparatus of claim 186 wherein one of the plurality of selectable regions has previously been selected and each location of the cursor in the cursor path is outside the previously selected selectable region.

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191. The apparatus of claim 190 wherein each location of the cursor in the cursor path is at least a predetermined distance from the previously selected selectable region.

192. The apparatus of claim 190 wherein each location of the cursor in the cursor path occurs at least a predetermined period of time after the selection of the previously selected selectable region.

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193. The apparatus of claim 186 wherein the amount of change to the selection threshold period varies in response to the distance between the intersected selectable region and the location of the cursor.

194. The apparatus of claim 186 wherein the amount of change to the selection threshold period varies in response to the difference between the time the intersection occurs and the time the location of the cursor occurs.

195. The apparatus of claim 186 wherein each of the plurality of selectable regions includes a subregion visible on the surface and an invisible subregion located outside the surface and wherein the plurality of visible subregions together at least partially circumscribes an area on the surface.

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196. The apparatus of claim 186 wherein the movement related signal is responsive to the movement of a body member of an operator having impaired ability to sense the position of the body member and the apparatus further comprises tactile indication means for indicating with the body member tactilely to the operator the position of the body member.

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197. The apparatus of claim 186 wherein one or more of the plurality of menu options represents any one of:

- (a) a prefix;
- (b) an infix; and
- (c) a suffix;

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to be added to a root word.

198. An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

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(a) means for at least partially delimiting a plurality of selectable regions with respect to a surface, each of the plurality of selectable regions associated respectively with a menu option;

(b) movement related signal receiving means for receiving a movement related signal indicating successive locations on the surface; and

25

(c) control means for:

(1) moving a cursor in a first manner on the surface in response to the movement related signal and thereafter detecting an intersection of the cursor and any one of the plurality of selectable regions;

(2) responsive to a first cursor path, moving the cursor in a second manner on the surface in response to the movement related signal, wherein the movement of the cursor in the second manner is attenuated relative to the movement of the cursor in the first manner; and

30

(3) in response to the period of the intersection equalling or exceeding a selection threshold period, selecting the menu option associated with the intersected

selectable region.

199. The apparatus of claim 198 wherein the moving of the cursor in the second manner is further responsive to the intersection.

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200. The apparatus of claim 199 wherein the moving of the cursor in the second manner is further responsive to a path indicated by successive locations occurring after the intersection.

201. The apparatus of claim 199 wherein the moving of the cursor in the second manner is further responsive to an angle of attack of the cursor path to the intersected selectable region.

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202. The apparatus of claim 198 wherein the plurality of selectable regions together at least partially circumscribes an area on the surface.

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203. The apparatus of claim 198 wherein the moving of the cursor in the second manner is further responsive to the velocity of the first cursor path.

204. The apparatus of claim 198 wherein the moving of the cursor in the second manner is further responsive to the acceleration of the first cursor path.

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205. The apparatus of claim 198 wherein the moving of the cursor in the second manner is further responsive to the proximity of a cursor location in the first cursor path to the selectable region most nearly along the first cursor path.

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206. In a human interface system including a first surface on which may be displayed a plurality of selectable regions each associated respectively with a menu option, and wherein a body member of an operator may indicate successive locations on a second surface, each location corresponding to a location on the first surface, a selection controller comprising:

(a) a direction detector for determining a move direction of the body member responsive to two or more of the successive locations on the second surface; and

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(b) a selector for selecting the menu option associated with the particular one of the plurality of selectable regions most nearly along a path on the first surface corresponding to the move direction of the body member, the selection occurring in advance of an intersection of any one of the locations on the first surface and the

particular selectable region.

207. In a human interface system including a first surface on which may be displayed a plurality of selectable regions each associated respectively with a menu option, and wherein a body member of an operator may indicate successive locations on a second surface, each location corresponding to a location on the first surface, a selection controller comprising:

- (a) a direction detector for determining a move direction of the body member responsive to two or more of the successive locations on the second surface; and
- (b) a selector for selecting the menu option associated with the particular one of the plurality of selectable regions most nearly along a path on the first surface corresponding to the move direction of the body member, the selector being responsive to an intersection of one of the locations on the first surface and the particular selectable region.

208. In a human interface system including

a first surface on which may be displayed a plurality of regions each associated respectively with a menu option;

wherein a body member of an operator may indicate successive locations on a second surface, each location corresponding to a location on the first surface; and

wherein a particular one of the regions may be selected responsive to a period of intersection of two or more of the locations on the first surface and the particular region equalling or exceeding a selection threshold period;

a selection threshold controller comprising:

- (a) a direction detector for determining a move direction of the body member responsive to two or more of the locations on the second surface; and
- (b) means for changing the selection threshold period responsive to the move direction of the body member.

209. The selection threshold controller of claim 208 further comprising a pointer for indicating with the body member successive locations on the second surface.

210. The selection threshold controller of claim 208 wherein the first surface includes the second surface.

211. The selection threshold controller of claim 208 wherein the second surface includes the first surface.

212. The selection threshold controller of claim 208 wherein the body member of the operator includes any one of the operator's shoulder, the operator's arm, the operator's elbow, the operator's wrist, the operator's hand, the operator's finger, the operator's thumb, the operator's leg, the operator's knee, the operator's ankle, the operator's foot, the operator's toe, the operator's hip, the operator's trunk, the operator's neck, the operator's tongue, the operator's lip, the operator's eye and the operator's head.

213. The selection threshold controller of claim 208 wherein the means for changing of the selection threshold period includes means for decreasing the selection threshold period responsive to the move direction indicating with the body member a path toward the particular region.

214. The selection threshold controller of claim 208 wherein the means for changing of the selection threshold period includes means for increasing the selection threshold period responsive to the move direction indicating with the body member a path away from the particular region.

215. In a human interface system including

a first surface on which may be displayed a plurality of regions each associated respectively with a menu option;

wherein a body member of an operator may indicate successive locations on a second surface, each location corresponding to a location on the first surface; and

wherein a particular one of the regions may be selected responsive to a period of intersection of two or more of the locations on the first surface and the particular region equalling or exceeding a selection threshold period;

a selection threshold controller comprising a threshold controller for changing the selection threshold period responsive to one of:

- (1) a path indicated by two or more of the successive locations on the first surface; and
- (2) one of the locations on the first surface intersecting a predetermined region on the first surface.

216. An apparatus for selecting an option from a menu, said apparatus for use with a general purpose computer system including a display on which may be displayed a cursor whose movement is responsive to a movement related signal, said apparatus comprising:

- (a) a medium readable by the general purpose computer system; and
- (b) an access program, stored on the medium and executable by the general purpose computer system, for:
 - (1) at least partially delimiting a plurality of selectable regions with respect to the display, each of the plurality of selectable regions associated respectively with a menu option; and
 - (2) selecting the menu option associated with the particular one of the plurality of selectable regions most nearly along a path indicated by a cursor location on the display and the movement related signal in advance of an intersection of the cursor and said particular selectable region.

217. An apparatus for selecting an option from a menu, said apparatus for use with a general purpose computer system including a display on which may be displayed a cursor whose movement is responsive to a movement related signal, said apparatus comprising:

- (a) a medium readable by the general purpose computer system; and
- (b) an access program, stored on the medium and executable by the general purpose computer system, for:
 - (1) at least partially delimiting a plurality of selectable regions with respect to the display, each of the plurality of selectable regions associated respectively with a menu option; and
 - (2) selecting the menu option associated with the particular one of the plurality of selectable regions most nearly along a path indicated by a cursor location on the display and the movement related signal in response to an intersection of the cursor and said particular selectable region.

218. An apparatus for selecting an option from a menu, said apparatus for use with a general purpose computer system including a display on which may be displayed a cursor whose movement is responsive to a movement related signal, said apparatus comprising:

- (a) a medium readable by the general purpose computer system; and
- (b) an access program, stored on the medium and executable by the general purpose computer system, for:

- (1) at least partially delimiting a plurality of selectable regions with respect to the display, each of the plurality of selectable regions associated respectively with a menu option; and
- (2) changing a selection threshold period responsive to a cursor path;
- 5 (3) detecting an intersection of the cursor and any of the plurality of selectable regions; and
- (4) in response to the period of the intersection equalling or exceeding the selection threshold period, selecting the menu option associated with the intersected selectable region.

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219. An apparatus including a surface, for measuring an individual's ability to move a position indicator on the surface in a direct path from a starting location on the surface to an ending location on the surface, said position indicator indicative of a position of one of the individual's body members, said apparatus comprising:

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- (a) the surface;
- (b) position indicating with the body member means for indicating with the body member on the surface a position of the body member;
- (c) collection means for collecting data indicative of a succession of the indicated positions on the surface; and
- 20 (d) measurement means for measuring the deviation of the path indicated by the collected data from a predetermined path between the starting location and the ending location.

220. An interactive terminal, including a display on which may be displayed:

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a plurality of selectable regions, each of the plurality of selectable regions associated respectively with a menu option and a selection threshold period; and
a cursor whose movement is responsive to the movement of a body member of an operator;

said terminal comprising:

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- (a) means for displaying the plurality of selectable regions on the display; and
- (b) control means for:
 - (1) in response to cursor movement toward a particular one of the plurality of selectable regions, decreasing the selection threshold period associated with the particular selectable region;
 - (2) in response to cursor movement diverging from a path toward the particular

selectable region, increasing the selection threshold period associated with the particular selectable region;

(3) detecting an intersection of the cursor and any of the plurality of selectable regions; and

(4) in response to the period of the intersection being equal to or greater than the selection threshold period associated with the intersected selectable region, selecting the menu option associated with the intersected selectable region.

221. The terminal of claim 220 wherein the plurality of selectable regions together at least partially circumscribes an area on the display.

222. A data entry system comprising:

(a) a computer system including:

(1) a display on which a moveable cursor may be displayed and then moved responsive to a movement related signal and on which a plurality of selectable regions may be displayed, each selectable region associated respectively with a sequence of one or more characters and a character sequence signal representing the associated sequence of one or more characters; and

(2) a processing unit coupled to the display and capable of executing an application program operative to accept any of the character sequence signals; and

(b) an input program, for execution on the processing unit, for inputting to the application program the character sequence signal representing the sequence of one or more characters associated with the particular one of the plurality of selectable regions most nearly along the path indicated by a cursor location and the movement related signal in advance of an intersection of the cursor and said particular selectable region.

223. A data entry system comprising:

(a) a computer system including:

(1) a display on which a moveable cursor may be displayed and then moved responsive to a movement related signal and on which a plurality of selectable regions may be displayed, each selectable region associated respectively with a sequence of one or more characters; and

(2) a processing unit coupled to the display and capable of executing an application program operative to accept any of the plurality of sequences of one or more

characters; and

- (b) an input program, for execution on the processing unit, for inputting to the application program the sequence of one or more characters associated with the particular one of the plurality of selectable regions most nearly along a cursor path, said input to the application program being responsive to an intersection of the cursor and said particular selectable region.

224. The data entry system of claim 220 wherein the input program further comprises means for changing a selection threshold period associated with said particular selectable region and wherein said input to the application program is further responsive to the duration of the period of the intersection equalling or exceeding the selection threshold period.

225. In a computer system including a display on which may be displayed a moveable cursor, and on which may be displayed a menu having a plurality of menu options, each of the menu options associated respectively with a selectable region on the display, an apparatus for selecting any one of the plurality of menu options, said apparatus comprising:

- (a) identification means for identifying which one of the plurality of selectable regions is most nearly along a cursor path; and
(b) selection means for selecting the menu option associated with the identified selectable region in advance of an intersection of the cursor and the identified selectable region.

226. In a computer system including a display on which may be displayed a moveable cursor, and on which may be displayed a menu having a plurality of menu options, each of the menu options associated respectively with a selectable region on the display, an apparatus for selecting any one of the plurality of menu options, said apparatus comprising:

- (a) means for detecting an intersection of the cursor and any one of the selectable regions; and
(b) selection means, responsive to the detected intersection, for selecting the menu option associated with the particular selectable region most nearly along a cursor path.

227. The apparatus of claim 226 wherein the selection means further comprises means for decreasing a selection threshold period associated with the particular selectable region and wherein the selection means is further responsive to the duration of the period of the intersection equalling or exceeding the selection threshold period.

228. A speech synthesis system comprising:

- (a) a display on which may be displayed a plurality of selectable regions, each of the selectable regions associated respectively with a sequence of one or more characters;
- 5 (b) a speech synthesizer; and
- (c) control means for:
 - (1) receiving a movement related signal and moving a cursor on the display responsive to the movement related signal;
 - (2) repetitively
 - 10 (A) detecting an intersection of the cursor and any of the plurality of selectable regions;
 - (B) changing a selection threshold period responsive to a cursor path to the intersected selectable region; and
 - (C) in response to the period of the intersection equalling or exceeding the
 - 15 selection threshold period, appending the sequence associated with the intersected selectable region to at least one previously selected sequence; and
 - (3) speaking, by means of the speech synthesizer, the word spelled by the appended sequences.

229. A device controller comprising:

- (a) means for displaying a plurality of selectable regions on a surface, each of the plurality of selectable regions associated respectively with a device control function;
- (b) movement related signal receiving means for receiving a movement related signal;
- 25 (c) signal generating means coupled to a device for generating a device control signal; and
- (d) control means for:
 - (1) moving a cursor on the surface in response to the received movement related signal;
 - (2) changing a selection threshold period responsive to a cursor path; and
 - 30 (3) detecting an intersection of the cursor and any one of the selectable regions;
 - (4) in response to the period of the intersection equalling or exceeding the selection threshold period, generating a device control signal corresponding to the device control function associated with the intersected selectable region.

230. The controller of claim 229 wherein the device includes a wheelchair.

231. In a computer system, an apparatus for measuring an individual's ability to move one of the individual's body members directly from a starting position to an ending position, said apparatus comprising:

- (a) receiving means, coupled to the computer system, for receiving a sampling among data indicative of successive positions of the body member; and
- (b) measurement means, executable on the computer system, for measuring deviation of the path indicated by the received position data from a direct path between the starting position and the ending position.

232. The apparatus of claim 231 further comprising:

- (c) a display, coupled to the computer system, on which a moveable cursor may be displayed; and
- (d) cursor movement means for moving the cursor on the display responsive to the received position data.

233. An apparatus for selecting an option from a menu, said apparatus comprising:

- (a) means for displaying a plurality of selectable regions on a surface, each of the plurality of selectable regions associated respectively with a menu option and a selection threshold period; and
- (b) movement related signal receiving means for receiving a movement related signal; and
- (c) control means for:
 - (1) moving a cursor on the surface in response to the received movement related signal;
 - (2) in response to a cursor path not toward any one of the plurality of selectable regions, increasing the selection threshold period associated with said one of the plurality of selectable regions;
 - (3) detecting an intersection of the cursor and any one of the plurality of selectable regions; and
 - (4) in response to the period of the intersection being equal to or greater than the selection threshold period associated with the intersected selectable region, selecting the menu option associated with the intersected selectable region.

234. A method of selecting an option from a menu, said method comprising the steps of:

displaying a plurality of selectable regions on a surface, each of the plurality of selectable regions associated respectively with a menu option;

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detecting a movement related signal and in response moving a cursor on the surface;

in response to an intersection of the cursor and the selectable region most nearly along a cursor path, selecting the menu option associated with the intersected selectable region.

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235. The method of claim 234 further comprising the step of changing a selection threshold period associated with the selectable region most nearly along the cursor path and wherein the selecting step is further responsive to the duration of the period of the intersection equalling or exceeding the selection threshold period.

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236. A method of selecting an option from a plurality of options, each of the plurality of options shown adjacent an edge of a display, said method comprising the steps of:

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detecting a movement related signal and in response moving a cursor on the display;

selecting the option shown most nearly along a cursor path in advance of an intersection of the cursor and the selected option;

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237. A method of measuring an individual's ability to move one of the individual's body members in a direct path from a starting position to an ending position, said method comprising the steps of:

collecting a sampling among data indicative of successive positions of the body member; and

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measuring the deviation of the path indicated by the collected data from a direct path between the starting position and the ending position.

238. An apparatus for selecting an option from a menu, said apparatus comprising:

- (a) cursor movement means for receiving a movement related signal and for moving a cursor on a display responsive to the received movement signal;
- (b) delimit means for delimiting with respect to the display a first plurality of regions and a second plurality of selectable regions, each of the first plurality of regions associated respectively with one of the second plurality of selectable regions, each of the second plurality of selectable regions associated respectively with a menu option, wherein at least one of the first plurality of regions is not coterminous with its associated one of the second plurality of selectable regions; and
- (c) selection means, responsive to an intersection of the cursor and any one of the first plurality of regions and to a selection event associated with the one of the second plurality of selectable region associated with the intersected one of the first plurality of regions, for selecting the menu option associated with the selectable region associated with the selection event.

239. The apparatus of claim 238 wherein the delimit means includes means for displaying at least part of at least one of the first plurality of regions on the display.

240. The apparatus of claim 238 wherein the delimit means includes means for displaying at least part of at least one of the second plurality of selectable regions on the display.

241. The apparatus of claim 238 wherein each of the at least one of the first plurality of regions intersects its associated one of the second plurality of selectable regions.

242. The apparatus of claim 241 wherein each of the at least one of the first plurality of regions shares at least one side with its associated selectable region.

243. The apparatus of claim 238 wherein none of the first plurality of regions is coterminous with its associated selectable region.

244. The apparatus of claim 238 wherein the first plurality of regions together at least partially circumscribes a first region on the display.

245. The apparatus of claim 244 wherein the second plurality of selectable regions together at

least partially circumscribes a second region on the display.

246. The apparatus of claim 238 wherein the selection event includes the durations of one or more successive periods of intersection of the cursor and the selectable region associated with the selection event equalling or exceeding a selection threshold period.

247. The apparatus of claim 238 wherein the selection means includes means for receiving a switch operation signal; and wherein the first selection event includes:

- (1) an intersection of the cursor and the selectable region associated with the selection event; and
- (2) at or near the time the intersection occurs, receipt of the switch operation signal.

248. The apparatus of claim 238 wherein the intersected one of the first plurality of regions is adjacent another one of the first plurality of regions and the intersection is the earliest intersection of a plurality of intersections of the cursor and the union of the intersected one of the first plurality of regions and the adjacent one of the first plurality of regions.

249. An apparatus for selecting an option from a menu, said apparatus for use with a general purpose computer system including a display on which may be displayed a cursor whose movement is responsive to a movement related signal, said apparatus comprising:

- (a) a medium readable by the general purpose computer system; and
- (b) an access program, stored on the medium and executable by the general purpose computer system, for:
 - (1) delimiting a first plurality of regions and a second plurality of selectable regions with respect the display, each of the first plurality of regions associated respectively with one of the second plurality of selectable regions, each of the second plurality of selectable regions associated respectively with a menu option, the second plurality of selectable regions together at least partially circumscribing a third region on the display; wherein at least one of the first plurality of regions is not coterminous with its associated one of the second plurality of selectable regions; and
 - (2) responsive to an intersection of the cursor and any one of the first plurality of regions and to a selection event associated with the one of the second plurality of selectable region associated with the intersected one of the first plurality of

regions, selecting the menu option associated with the selectable region associated with the selection event.

250. For use with a computer system including a display, the computer system being capable of
5 executing an application program, a computer access device for an operator having impaired motor control, said device comprising:

- (a) cursor movement means for receiving a movement related signal and for moving the cursor on the display responsive to the received movement signal;
- (b) display means for displaying a first plurality of regions on the display, each of the first
10 plurality of regions associated respectively with one of a second plurality of selectable regions, each of the first plurality of regions including all the area of its associated one of the second plurality of selectable regions, the first plurality of regions together at least partially circumscribing a third region on the display on which may be displayed at least part of the output of the application program, the second plurality of selectable
15 regions together at least partially circumscribing the third region, each of the second plurality of selectable regions associated respectively with a menu option, at least one of the menu options representing an input for the application program; and wherein the display means, responsive to an intersection of the cursor and any one of the first plurality of regions, is operative to display on the display at least part of the one of the
20 second plurality of selectable regions associated with the intersected region; and
- (c) input means, responsive to a dwell event associated with any one of the second plurality of selectable regions associated with one of the at least one menu options representing an input for the application program, for inputting to the application program the menu option associated with the selectable region associated with the
25 dwell event.

251. In a human interface system wherein a body member of an operator may indicate successive locations on a surface, a menu option selector for selecting a menu option from a plurality of menu options, said menu option selector comprising:

- (a) the surface on which may be delimited a first plurality of regions and a second
30 plurality of selectable regions, each of the first plurality of regions associated respectively with one of the second plurality of selectable regions, each of the second plurality of selectable regions associated respectively with a menu option; and wherein at least one of the first plurality of regions is not coterminous with its associated one of

regions, selecting the menu option associated with the selectable region associated with the selection event.

250. For use with a computer system including a display, the computer system being capable of
5 executing an application program, a computer access device for an operator having impaired motor control, said device comprising:

- (a) cursor movement means for receiving a movement related signal and for moving the cursor on the display responsive to the received movement signal;
- (b) display means for displaying a first plurality of regions on the display, each of the first
10 plurality of regions associated respectively with one of a second plurality of selectable regions, each of the first plurality of regions including all the area of its associated one of the second plurality of selectable regions, the first plurality of regions together at least partially circumscribing a third region on the display on which may be displayed at least part of the output of the application program, the second plurality of selectable
15 regions together at least partially circumscribing the third region, each of the second plurality of selectable regions associated respectively with a menu option, at least one of the menu options representing an input for the application program; and wherein the display means, responsive to an intersection of the cursor and any one of the first plurality of regions, is operative to display on the display at least part of the one of the
20 second plurality of selectable regions associated with the intersected region; and
- (c) input means, responsive to a dwell event associated with any one of the second plurality of selectable regions associated with one of the at least one menu options representing an input for the application program, for inputting to the application program the menu option associated with the selectable region associated with the
25 dwell event.

251. In a human interface system wherein a body member of an operator may indicate successive locations on a surface, a menu option selector for selecting a menu option from a plurality of menu options, said menu option selector comprising:

- (a) the surface on which may be delimited a first plurality of regions and a second
30 plurality of selectable regions, each of the first plurality of regions associated respectively with one of the second plurality of selectable regions, each of the second plurality of selectable regions associated respectively with a menu option; and wherein at least one of the first plurality of regions is not coterminous with its associated one of

the second plurality of selectable regions; and

(b) in response to:

(1) an intersection of one of the successive locations and any one of the first plurality of regions; and

(2) thereafter, the durations of one or more successive periods of intersection of two or more of the successive locations and the one of the second plurality of selectable regions associated with the intersected one of the first plurality of regions.

a selector for selecting the menu option associated with the one of the second plurality of selectable regions associated with the intersected one of the first plurality of regions.

252. A speech synthesis system comprising:

(a) a computer system including a display on which may be displayed a first plurality of regions, each of the first plurality of regions associated respectively with one of a second plurality of selectable regions, each of the second plurality of selectable regions associated respectively with a sequence of one or more characters;

(b) a speech synthesizer coupled to the computer system; and

(c) control means for:

(1) receiving a movement related signal and moving a cursor on the display responsive to the movement related signal;

(2) repetitively, responsive to:

(A) an intersection the cursor any one of the first plurality of regions; and

(B) thereafter, the durations of one or more periods of intersection of the cursor and the one of the second plurality of selectable regions associated with the intersected one of the first plurality of regions.

appending to at least one previously selected sequence the sequence associated with the one of the second plurality of selectable regions associated with the intersected one of the first plurality of regions; and

(3) speaking, by means of the speech synthesizer, the word spelled by the appended sequences.

253. A method of selecting an option from a menu, said method comprising the steps of:

receiving a movement related signal and moving a cursor on a surface responsive thereto;

delimiting a first plurality of regions and a second plurality of selectable regions with respect to a surface, each of the first plurality of regions associated respectively with one of the second plurality of selectable regions, each of the second plurality of selectable regions associated respectively with a menu option; wherein at least one of the first plurality of regions is not coterminous with its associated one of the second plurality of selectable regions; and

responsive to an intersection of the cursor and any one of the first plurality of regions and to a selection event associated with the one of the second plurality of selectable region associated with the intersected one of the first plurality of regions, selecting the menu option associated with the selectable region associated with the selection event.

254. An apparatus, including a surface on which may be displayed a moveable cursor, said apparatus allowing an operator to align a pointer with a predetermined location on the surface, said apparatus comprising:

- (a) display means for displaying the cursor on the surface;
- (b) movement related signal receiving means for receiving a movement related signal; and
- (c) control means for moving the cursor in response to the movement related signal and for thereafter inhibiting movement of the cursor for a first period of time in response to an operator action detected by the movement related signal receiving means.

255. The apparatus of claim 254 wherein the surface includes a display area and the display means further includes means for confining at least part of the cursor to the display area.

256. The apparatus of claim 254 wherein the operator action includes one of:

- (1) an intersection of at least part of the cursor and a region on the surface for a second period of time; and
- (2) a switch operation.

257. The apparatus of claim 254 further comprising start indication means for indicating the start of the first period of time and end indication means for indicating the end of the first period of time.

258. The apparatus of claim 257 wherein the start indication means includes changing means for

changing the appearance of the cursor and the end indication means includes restoring means for restoring the appearance of the cursor to the appearance it had before the changing means changed it.

- 5 259. The apparatus of claim 254 wherein the movement related signal is responsive to the movement of a body member of an operator having impaired ability to sense the position of the body member and the apparatus further comprises tactile indication means for indicating tactilely to the operator the position of the body member.
- 10 260. An apparatus, including a surface on which may be displayed a moveable cursor, said apparatus allowing an operator to align a pointer producing a movement related signal with the cursor, said apparatus comprising:
- (a) display means for displaying the cursor on the surface;
 - (b) movement related signal receiving means for receiving the movement related signal;
 - 15 (c) detection means for detecting a switch operation; and
 - (d) control means for moving the cursor responsive to the movement related signal and for thereafter inhibiting movement of the cursor for a first period of time in response to a switch operation detected by the detection means.
- 20 261. An apparatus, including a surface on which may be displayed a moveable cursor, said apparatus allowing an operator to align a pointer with a predetermined location on the surface, said apparatus comprising:
- (a) display means for displaying the cursor on the surface;
 - (b) movement related signal receiving means for receiving a movement related signal;
 - 25 (c) switch operation signal receiving means for detecting a switch operation signal; and
 - (d) control means for
 - (1) moving the cursor responsive to the movement related signal;
 - (2) thereafter, in response to a detected first switch operation, inhibiting movement of the cursor; and
 - 30 (3) thereafter, in response to a detected second switch operation, moving the cursor responsive to the movement related signal.
262. In a human interface system including a surface on which may be displayed a cursor whose movement usually tracks the movement of a body member of an operator, an apparatus for

aligning the body member of the operator with a predetermined location on the surface, said apparatus comprising a cursor controller for:

- (a) detecting movement of the body member of the operator;
- (b) detecting an operator action; and
- 5 (c) moving the cursor on the surface in response to the movement of the body member of the operator and thereafter inhibiting movement of the cursor for a first period of time in response to the detected operator action.

263. The apparatus of claim 262 wherein the cursor controller is further operative to display a
10 target at the predetermined location on the surface during at least part of the first period of time and to display the cursor at the predetermined location at the end of the first period of time.

264. The apparatus of claim 262 wherein the cursor controller is further operative to display a
15 target in or in close proximity to the location of the cursor immediately prior to the start of the first period of time.

265 The apparatus of claim 262 wherein the operator action includes one of:

- (1) the intersection of the cursor and a region on the display area for a second period of
20 time; and
- (2) a switch operation.

266. In an interactive terminal including:

- (1) a display on which a moveable first cursor may be displayed; and
- 25 (2) a region on the display, said region not greater in size than the display, wherein movement of the hotspot of the first cursor within the region reflects the movement of at least one body member of the operator of the interactive terminal and wherein movement of a body member that would, if accurately reflected in cursor movement, take the cursor out of the region, is not reflected in cursor movement, such that the hotspot of the
30 cursor remains on the display, said interactive terminal comprising a cursor controller for:
 - (a) inhibiting display of the first cursor;
 - (b) displaying a stationary target on the display for a prescribed period of time; and then
 - (c) displaying a moveable stationary target in or in close proximity to the position of the stationary target.

so that the operator may align the body member with the position of the stationary target.

267. For use with a computer system including a display upon which a moveable cursor may be displayed, an apparatus for temporarily inhibiting cursor movement, said apparatus comprising:

- (a) a pointer; and
- (b) a program executable by the computer system for moving the cursor responsive to the pointer and for thereafter inhibiting cursor movement for a prescribed period of time in response to an operator action.

268. An apparatus comprising:

- (a) a computer system including a display on which a moveable cursor may be displayed;
- (b) movement related signal receiving means, coupled to the computer system, for receiving a movement related signal; and
- (c) program means, coupled to the computer system, for moving the cursor responsive to the movement related signal and for thereafter temporarily inhibiting cursor movement in response to a signal detected by the movement related signal receiving means.

269. An apparatus allowing an operator having impaired motor control to align a pointer with a cursor, said apparatus comprising:

- (a) a display area;
- (b) movement related signal receiving means for receiving a movement related signal;
- (c) operator action detection means for detecting an operator action; and
- (d) control means for:
 - (1) displaying a first cursor on the display area;
 - (2) moving the first cursor responsive to the movement related signal while confining the hotspot of the first cursor to the display area; then
 - (3) in response to the detected operator action, displaying a second cursor differing in configuration from the first cursor at a predetermined location on the display area during a first period of time; and
 - (4) at the end of the first period of time, displaying the first cursor in or in close proximity to the predetermined location on the display area.

270. The apparatus of claim 269 further comprising means for displaying a plurality of regions on

the display area and wherein the predetermined location is a location associated with the region intersected by the hotspot of the first cursor when the operator action detection means detects the operator action.

5 271. An apparatus allowing an operator having below normal motor capabilities to bring a pointer and a cursor coupled to the pointer into alignment with each other, said apparatus comprising:

(a) a display area;

(b) a processor operative to:

10 (1) display a first cursor on the display area,

(2) move the first cursor responsive to operator movement while confining at least part of the first cursor to the display area; and then

(3) responsive to an intersection of the first cursor and a region on the display area for a first period of time:

15 (i) remove the first cursor from the display area for a second period of time; and

(ii) during the second period of time, display at a predetermined location on the display area a second cursor differing in configuration from the first cursor.

20 272. For use with a system comprising a pointer and a surface on which is displayed a first cursor whose movement on the surface is responsive to the movement of the pointer, a method of aligning the first cursor with a predetermined location on the surface, said method comprising the steps of:

25 (a) producing the first cursor on the surface;

(b) moving the first cursor responsive to the movement of the pointer, said movement restricted to a region on the surface; and then

(c) responsive to an operator action, producing a second cursor at a predetermined location on the surface for a period of time; and

30 (d) positioning the first cursor in or in close proximity to the predetermined location..

273. The method of claim 272 further comprising the steps of:

indicating with the body member the start of the period of time; and

indicating with the body member the end of the period of time.

274. The method of claim 273 wherein the step of indicating with the body member the start of the period of time includes generating a first signal and the step of indicating with the body member the end of the period of time includes generating a second signal distinct from the first signal.

275. In a menu interface system, an apparatus for ordering menu options comprising:

- (a) order means for ordering a plurality of named menu options in an order responsive to the length of the name of each named menu option; and
- (b) display means for displaying the plurality of named menu options in said order.

276. The apparatus of claim 275 wherein the displayed plurality of named menu options together at least partially circumscribe a region on a display.

277. The apparatus of claim 275 wherein each of the displayed menu options is adjacent at least one other display menu option.

278. The apparatus of claim 275 wherein the order means includes an arithmetic logic unit.

279. The apparatus of claim 275 wherein the name of each named menu option includes letters and the length of each name includes the number of letters in the name.

280. The apparatus of claim 275 wherein the name of each named menu option includes letters and the order means is further responsive to the alphabetic order of each name.

281. In a menu interface system, an apparatus for displaying words, said apparatus comprising:

- (a) order means for ordering a plurality of words in an order responsive to the number of letters in each word; and
 - (b) display means for displaying the plurality of words in said order;
- whereby an operator who knows the relative number of letters in a desired word and one of the plurality of words may limit his search for the desired word.

282. The apparatus of claim 281 wherein the display means includes a display.

283. An apparatus for selecting a sequence of one or more words, said apparatus comprising:

- (a) display means for displaying on a display a plurality of sequences of one or more words in an order responsive to the length of each sequence;
- (b) cursor movement means for receiving a movement related signal and for moving a cursor on the display responsive to the received movement signal; and
- (c) selection means, responsive to a selection event associated with any one of the sequences, for selecting the sequence associated with the selection event.

284. The apparatus of claim 283 wherein each sequence is composed of one word.

285. The apparatus of claim 283 wherein each sequence includes one or more characters and the length of each sequence includes the number of characters in the sequence.

286. The apparatus of claim 283 wherein the selection event includes an intersection of the cursor and a region on the display associated with the word associated with the selection event.

287. The apparatus of claim 283 wherein at least one of the sequence represents a sentence.

288. The apparatus of claim 283 further comprising means for modifying the selected sequence.

289. A speech synthesis system comprising:

- (a) a display for displaying a plurality of named menu options in an order responsive to the length of the name of each named menu option, each of the named menu options associated respectively with a sequence of one or more characters;
- (b) a speech synthesizer; and
- (c) control means for:
 - (1) selecting, responsive to a selection event associated with any one of the named menu options, the sequence of one or more characters associated with the named menu option associated with the selection event; and
 - (2) speaking, by means of the speech synthesizer, the selected sequence of one or more characters.

290. For use with a computer capable of executing an application program, a method of data entry comprising the steps of:

- (a) displaying a plurality of named menu options in an order responsive to the length of the name of each named menu option, each of the named menu options associated respectively with a sequence of one or more characters; and
- (b) inputting to the application program, responsive to a selection event associated with one of the named menu options, the sequence of one or more characters associated with the named menu option associated with the selection event.

291. The method of claim 290 wherein the name of at least one of the named menu options represents the sequence of one or more characters associated with the at least one name menu option.

292. In a menu interface including:

- (1) a menu including a plurality of menu options; and
- (2) a display area with respect to which may be at least partially delimited a plurality of selectable regions, each selectable region associated respectively with one of the plurality of menu options;

an apparatus for selecting one of the menu options, said apparatus comprising:

- (a) delimit means for at least partially delimiting the selectable regions;
- (b) indication means, coupled to the delimit means, for displaying each menu option on the display area, wherein the location of each displayed menu option indicates the location of the associated selectable region and wherein none of the displayed menu options intersects the selectable region associated therewith; and
- (c) selection means, responsive to a selection event associated with any one of the selectable regions, for selecting the menu option associated with the selectable region associated with the selection event.

293. The apparatus of claim 292 wherein none of the displayed menu options is located adjacent the selectable region associated therewith.

294. The apparatus of claim 293 wherein the relative location of each displayed menu option with respect to the other displayed menu options indicates the relative location of the associated selectable region with respect to the other selectable regions.

295. The apparatus of claim 292 wherein each selectable region is located outside the display

area.

296. The apparatus of claim 295 wherein each selectable region is unbounded on at least one side.

5 297. The apparatus of claim 292 wherein each selectable region is located on the display area adjacent an edge of the display area.

298. The apparatus of claim 292 wherein the plurality of selectable regions together at least partially circumscribe a region on the display area.

10 299. The apparatus of claim 292 wherein the plurality of selectable regions together at least partially circumscribe a transparent region within the display area.

15 300. The apparatus of claim 292 wherein each of the menu options represents a sequence of one or more graphic symbols, one or more sequences of the plurality of sequences including one or more ideographs, each of the plurality of sequences having a common characteristic.

301. The apparatus of claim 292 wherein each of the menu options represents a symbol in a symbol set.

20 302. The apparatus of claim 301 wherein the symbol set is any one of the Picture Communication Symbols symbol set, Rebus symbol set, Picsyms symbol set, Pictogram Ideogram Communication Symbols symbol set, Yerkish symbol set, Blissymbolics symbol set, and a set of depictions of the signs of a manual sign language.

25 303. The apparatus of claim 292 wherein each of the menu options represents a word, each word beginning with a common sequence of one or more characters.

30 304. The apparatus of claim 303 wherein the common sequence of one or more characters includes a letter from one of the Afrikaans, Albanian, Amharic, Arabic, Armenian, Assamese, Assyrian, Avar, Azerbaijani, Balinese, Bamara, Bantu, Bashkir, Basque, Bengali, Birhari, Bulgarian, Buluba-Lulua, Burmese, Buryat, Byelorussian, Caddoan, Catalan, Chechen, Chikaranga, Chippewa, Choctaw, Church Slavik, Chuvash, Coptic, Cree, Croatian, Cyrillic, Czech, Dakota, Danish, Dari, Devanagari, Dutch, Dzongkha, English, Eskimo,

Esperanto, Estonian, Ewe, Farsi, Fijian, Filipino, Finnish, Flemish, French, Fulani, Gaelic, Galician, Georgian, German, Greek, Gujarati, Gurmakhi, Harari, Hausa, Hawaiian, Hebrew, Hindi, Hiragana, Ibo, Icelandic, Indonesian, Irish, Iroquoian, Italian, Kabardian, Kalmyk, Kannada, Kanuri, Kashmiri, Katakana, Kazakh, Khasi, Khmer, Kirghiz, Kishmiri, Komi, Kongo, Kurdish, Lao, Latin, Latvian, Lithuanian, Lu-Guanda, Macedonian, Magahi, Maithili, Makua, Malagasy, Malay, Malayalam, Maltese, Mandingo, Manipuri, Marathi, Masai, Mizo, Moldavian, Mongolian, Munda, Naga, Navaho, Nyanja, Nepalese, Norwegian, Oriya, Oromo, Ossetian, Pashto, Polish, Portugese, Punjabi, Rajasthani, Rhaeto-Romanic, Rumanian, Russian, Samoan, Sangs, Serbian, Serbo-Croatian, Sinhalese, Sinhi, Sioux, Slovak, Slovenia, Spanish, Sundanese, Swahili, Swedish, Syriac, Tadjik, Tagalog, Tajik, Tamil, Tatar, Telugu, Thai, Tibetan, Turkish, Turkmen, Udmurt, Uighur, Ukranian, Umbundu, Urdu, Uzbek, Vietnamese, Visayan, Welsh, Yakut, Yoruba and phonetic alphabets.

305. The apparatus of claim 292 wherein each of the menu options represents a sequence including one or more characters, each sequence including a common sequence of one or more characters.
306. The apparatus of claim 292 wherein the indication means further comprises display means for displaying a plurality of indicating regions, each indicating region associated respectively with one of the menu options, each indicating region displayed in a location intersecting or near the associated displayed menu option, and wherein no one indicating region intersects the selectable region associated with the menu option associated with said one indicating region.
307. The apparatus of claim 306 wherein at least part of each indicating region is displayed in one manner and at least part of the selectable region associated with the menu option associated with each indicating region is displayed in a manner similar to the one manner.
308. The apparatus of claim 307 wherein the manner of display is any one of:
- (1) a size;
 - (2) a shape;
 - (3) a hue;
 - (4) a brightness;

- (5) a contrast;
- (6) a tone;
- (7) a dithering;
- (8) a fill;
- (9) a font;
- (10) a blinking;
- (11) a hatching; and
- (12) a pattern.

5

10 309. The apparatus of claim 306 further comprising movement related signal receiving means for receiving a movement related signal indicating a location with respect to the display area; and wherein the indication means further comprises intersection indication means for indicating an intersection of the location and any one of the selectable regions in the indicating region associated with the menu option associated with the intersected selectable region.

15

310. The apparatus of claim 306 further comprising movement related signal receiving means for receiving a movement related signal indicating successive locations with respect to the display area; and wherein the indication means further comprises intersection indication means for indicating the duration of a period of intersection of at least two of the successive locations and any one of the selectable regions in the indicating region associated with the menu option associated with the intersected selectable region.

20

311. The apparatus of claim 306 wherein the selection means further comprises selection indication means, responsive to the selection event, for indicating that the selection event has occurred.

25

312. The apparatus of claim 292 wherein the selection means includes a processor coupled to a switch and the selection event includes an operation of the switch.

30

313. The apparatus of claim 292 wherein the selection means includes timing circuitry and the selection event includes a signal from the timing circuitry indicating an expiration of a predetermined period of time.

314. A menu option selector comprising:

- (a) a first menu including a first plurality of menu options;
- (b) a surface including a display area with respect to which may be at least partially delimited a plurality of selectable regions, each selectable region capable of being associated respectively with one of the first plurality of menu options;
- (c) a first plurality of indicators on the display area, each of the first plurality of indicators associated respectively with one of the first plurality of menu options, and each one of the first plurality of indicators indicating the location of the selectable region capable of being associated with the menu option associated with said one of the first plurality of indicators; and
- (d) means for selecting any one of the selectable regions.

315. The menu option selector of claim 314 wherein each of the selectable regions is outside the display area.

316. The menu option selector of claim 315 further comprising a second menu including a second plurality of menu options, each of the second plurality of menu options capable of being associated respectively with one of the selectable regions; and a second plurality of indicators on the display area, each of the second plurality of indicators associated respectively with one of the second plurality of menu options, and each one of the second plurality of indicators indicating the location of the selectable region capable of being associated with the menu option associated with said one of the second plurality of indicators.

317. The menu option selector of claim 316 further comprising association means for associating the plurality of selectable regions with either one of the first plurality of menu options or the second plurality of menu options.

318. The menu option selector of claim 317 wherein the association means is responsive to a selection event.

319. The menu option selector of claim 317 wherein the association means is responsive to an expiration of a predetermined period of time.

320. For use with a general purpose computer system including a display with respect to which may be at least partially delimited a plurality of selectable regions, each selectable region associated respectively with a menu option, an apparatus for selecting a menu option from the plurality of menu options, said apparatus comprising:

- 5 (a) a medium readable by the general purpose computer system; and
- (b) a program, stored on the medium and executable by the general purpose computer system, for:
 - (1) at least partially delimiting the selectable regions with respect to the display;
 - 10 (2) displaying each menu option on the display, the location of each displayed menu option indicating the location of the associated selectable region and none of the displayed menu options intersecting the selectable region associated therewith; and
 - (3) responsive to a selection event associated with any one of the selectable regions, selecting the menu option associated with the selectable region associated with
15 the selection event.

321. In a computer system including a display with respect to which may be at least partially delimited a plurality of selectable regions, each selectable region associated respectively with a menu option, an apparatus for selecting a menu option from the plurality of menu options, said apparatus comprising:

- 20 (a) the computer system; and
- (b) a program, for execution on the computer system, for:
 - (1) displaying a plurality of indicating regions on the display, each indicating region associated respectively with one of the menu options;
 - 25 (2) displaying each menu option in a location intersecting or near the associated indicating region, wherein each indicating region:
 - (i) indicates the location of the selectable region associated with the menu option associated with the indicating region; and
 - (ii) does not intersect the selectable region associated with the menu option
30 associated with the indicating region; and
 - (3) selecting, responsive to a selection event associated with any one of the selectable regions, the menu option associated with the selectable region associated with the selection event.

322. A speech synthesis system comprising:

- (a) a display;
- (b) a speech synthesizer; and
- (c) control means for:

- (1) receiving a movement related signal indicating successive locations on the display;
- (2) displaying:
 - (i) a plurality of selectable regions on the display, the plurality of selectable regions together at least partially circumscribing a region on the display, each selectable region associated respectively with a sequence of one or more characters; and
 - (ii) the plurality of sequences in the at least partially circumscribed region, wherein the location of each sequence indicates the location of the associated selectable region;
- (2) repetitively, in response to an intersection of one of the successive locations and a selectable region and a dwell event, appending the sequence associated with the intersected selectable region to at least one previously selected sequence; and
- (3) speaking, by means of the speech synthesizer, the word spelled by the appended sequences.

323. For use with a menu interface including a display area and a menu hierarchy including a menu including a plurality of menu options, at least one of the menu options associated with a submenu including a plurality of submenu options, a method of selecting a submenu option from the menu hierarchy, said method comprising the steps of:

at least partially delimited a plurality of selectable regions with respect to the display area, each selectable region associated respectively with one of the menu options and with one of the submenu options;

displaying a plurality of submenu indicating regions on the display area, each submenu indicating region associated respectively with one of the submenu options, wherein each submenu indicating region is displayed in a manner indicating the location of the selectable region associated with the submenu option associated with the submenu indicating region;

selecting, responsive to a first selection event associated with any one of the selectable regions, the menu option associated with the selectable region associated with the first selection event; and

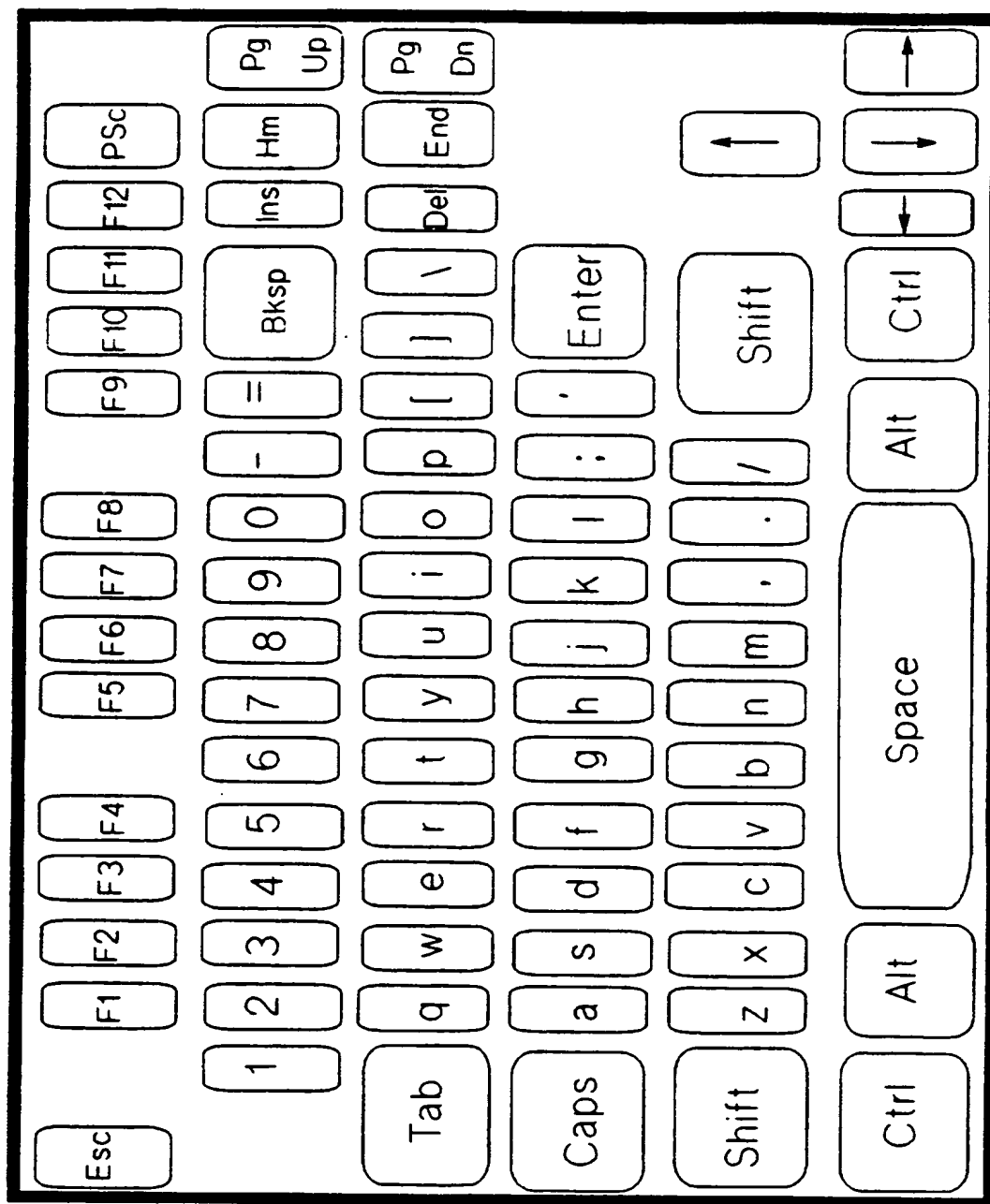
5 thereafter selecting, responsive to a second selection event associated with any one of the selectable regions, the submenu option associated with the selectable region associated with the second selection event.

324. The method of claim 323 further comprising the step of displaying a plurality of menu
10 indicating regions, each menu indicating region associated respectively with one of the menu options, wherein each menu indicating region is displayed in a manner indicating the location of the selectable region associated with the menu option associated with the menu indicating region.

15 325. The method of claim 324 further comprising the step of displaying a plurality of submenu indicating regions, each submenu indicating region associated respectively with one of the submenu options, wherein each submenu indicating region is displayed in a manner indicating the location of the selectable region associated with the submenu option associated with the submenu indicating region; and wherein the submenu indicating regions each
20 intersect the menu indicating region associated with the menu option associated with the submenu.

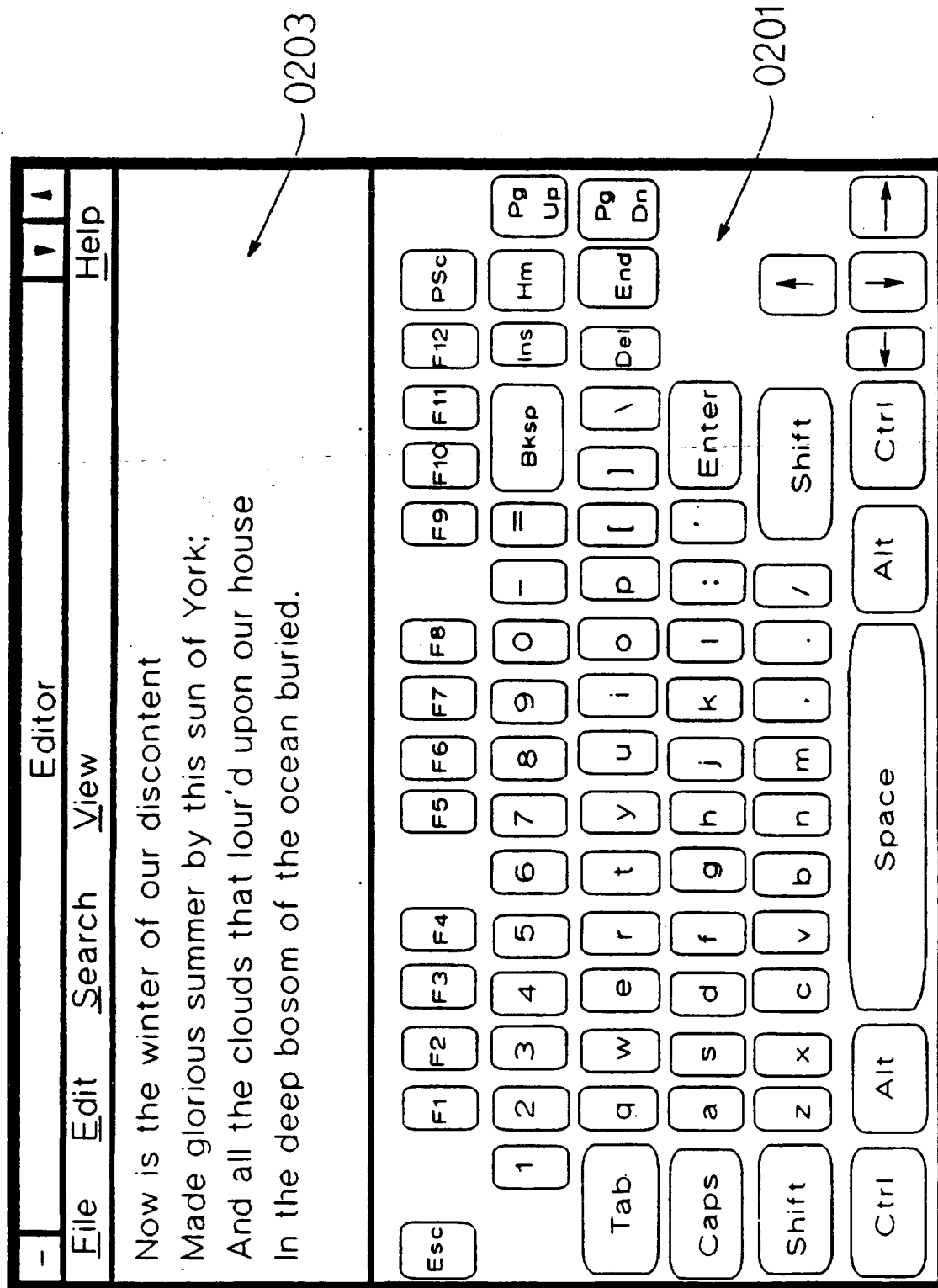
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FIG. 1



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FIG. 2



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FIG. 4

Space	a	b	c
d	e	f	g
h	i	j	k
l	m	?	.

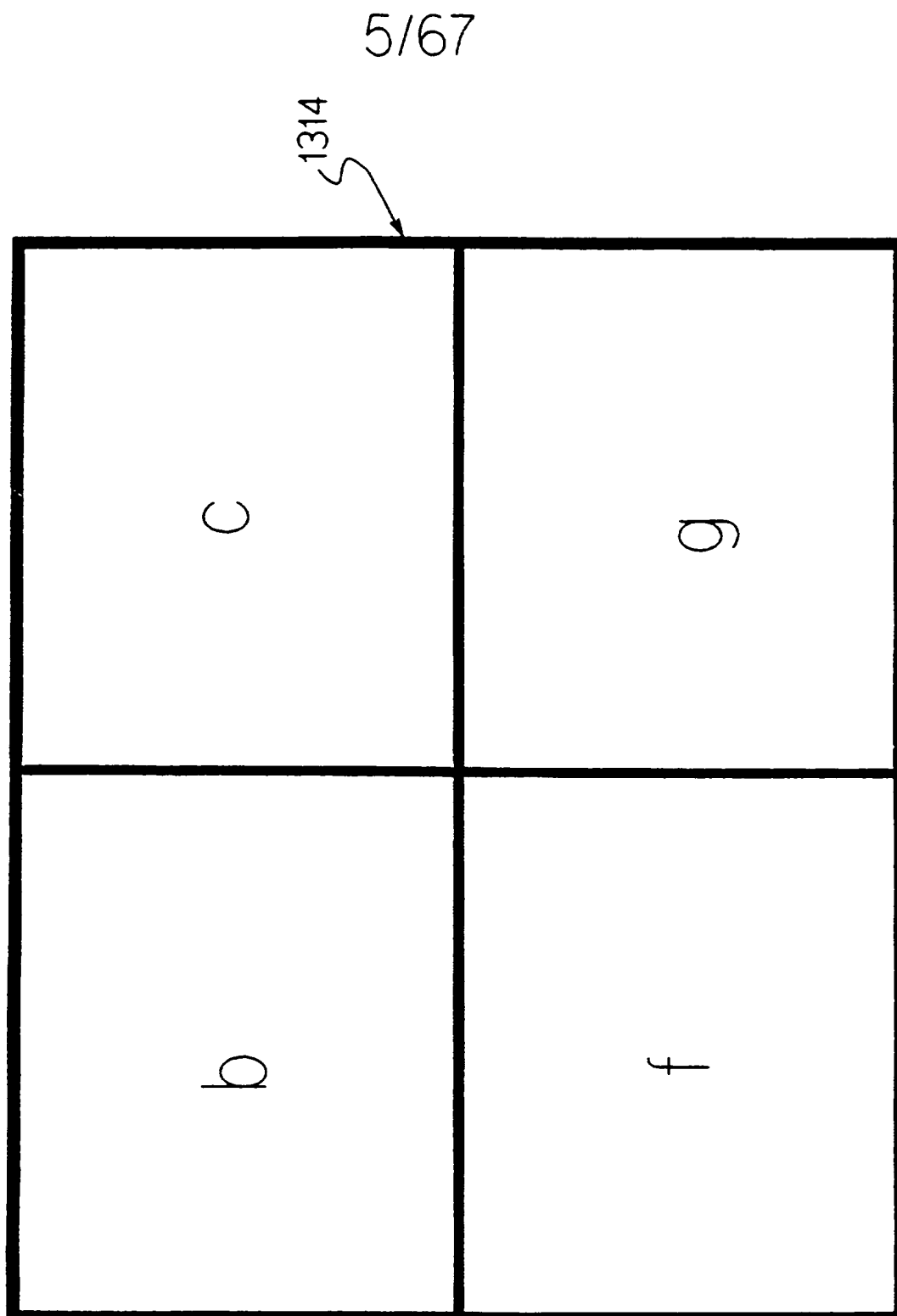
1320

1314

1322

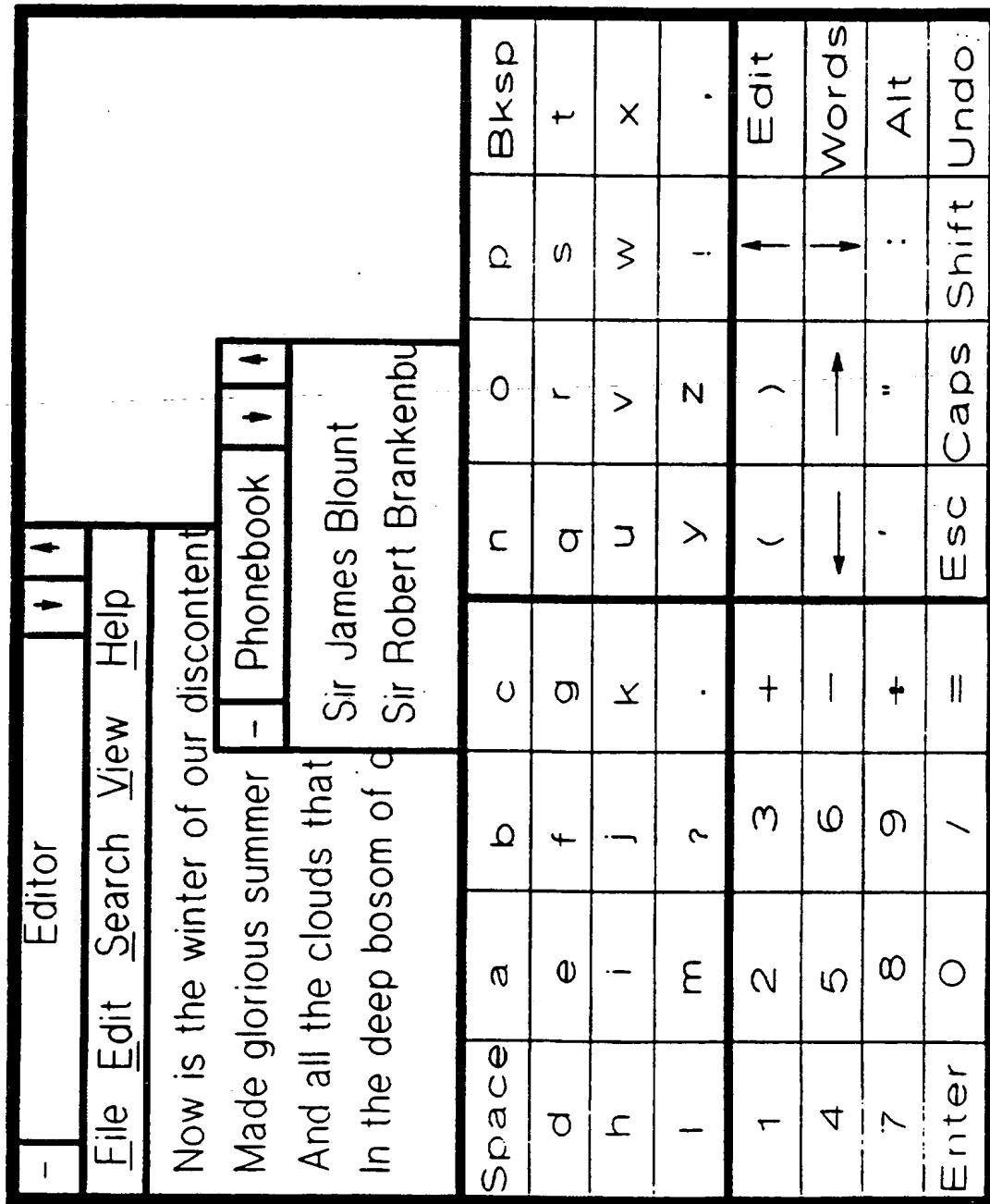
1324

FIG. 5



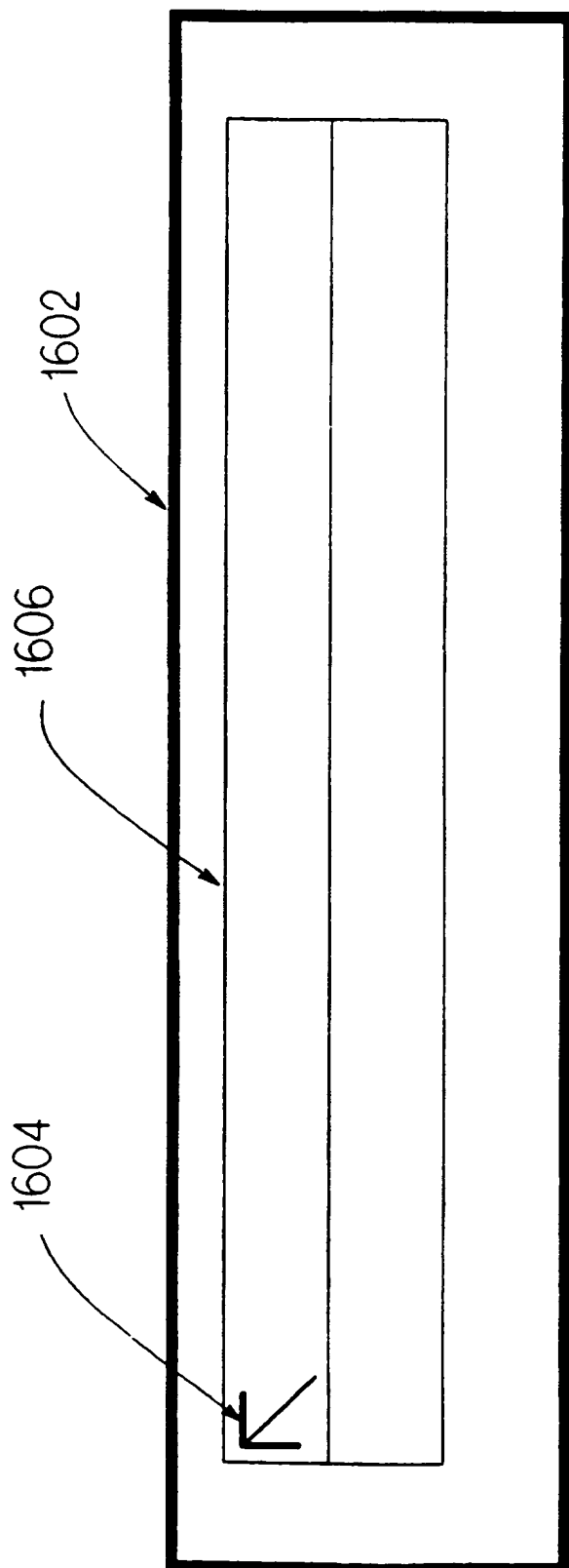
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FIG. 6



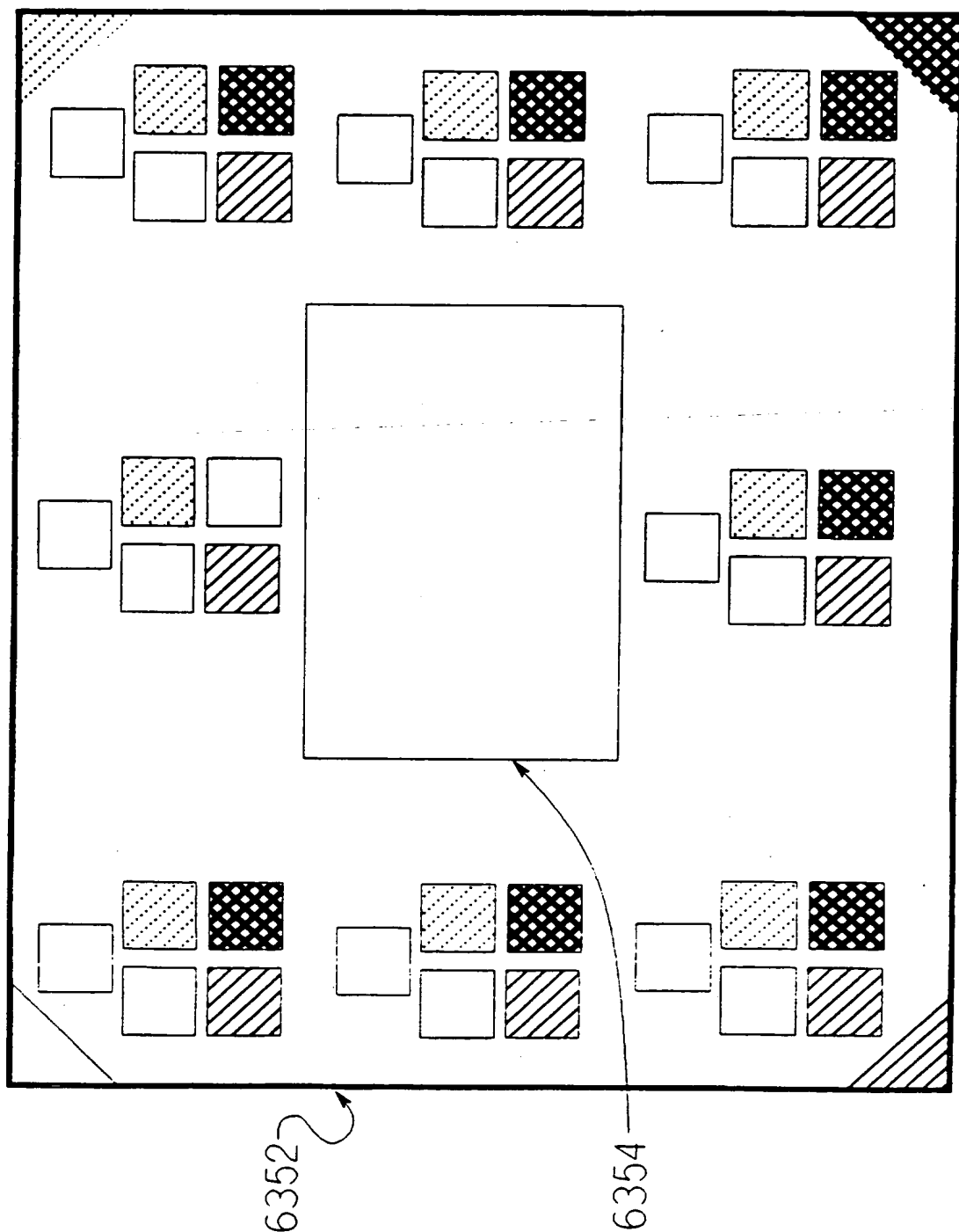
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FIG. 7



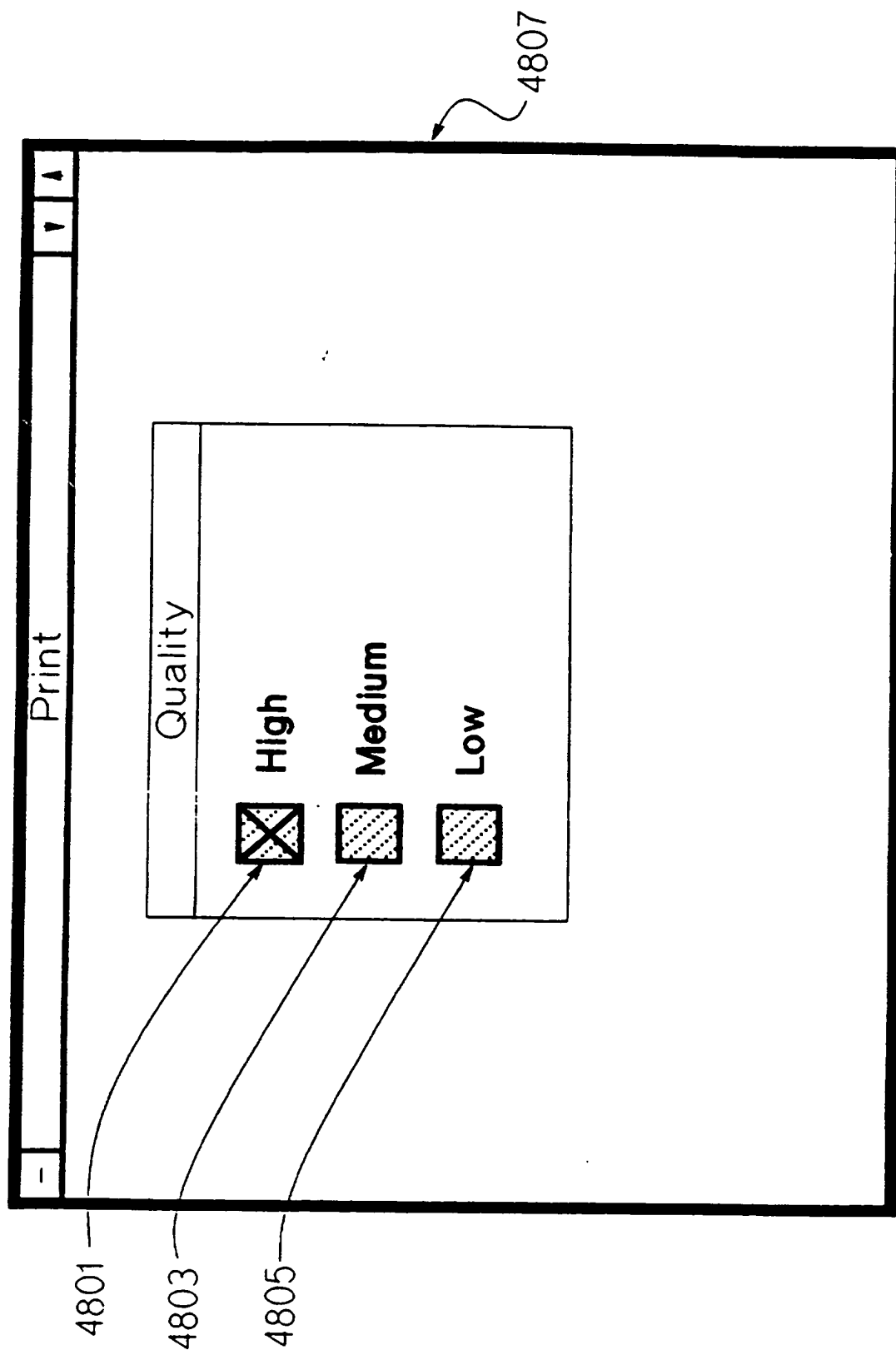
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FIG. 8



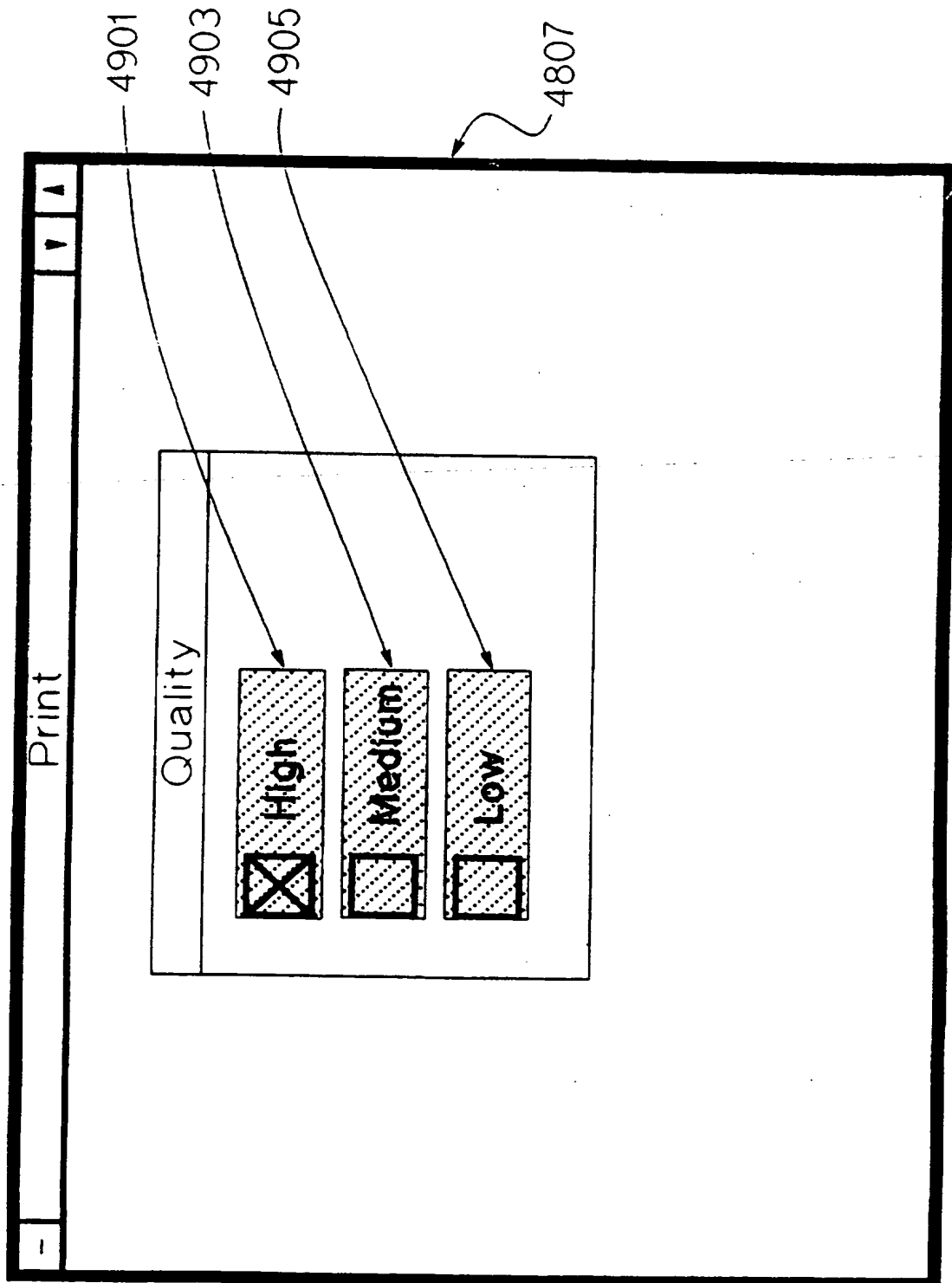
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FIG. 9



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FIG. 10



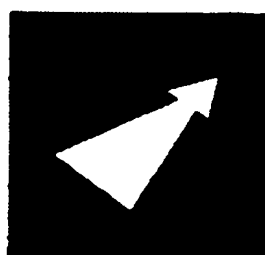
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FIG. 11

Meaning	Picture Communication Symbols	Rebus	Pic Sym	Blissymbol
want				
eat				
think				
where				
friend				
wheelchair				
television				
yesterday				
no				
not, un				

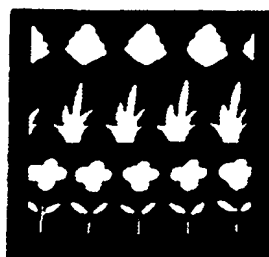
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FIG. 12(a)



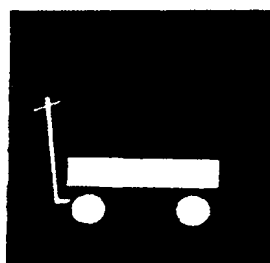
go

FIG. 12(b)



garden

FIG. 12(c)



wagon

FIG. 12(d)



sad

SUBSTITUTE SHEET (RULE 26)

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FIG. 13(a)



pretzel

FIG. 13(b)



potato stick

FIG. 13(c)



m & m

FIG. 13(d)



tidbit

FIG. 13(e)



gumdrop

FIG. 13(f)



cereal

FIG. 13(g)



peanut

FIG. 13(h)



fizzie

FIG. 13(i)



butterscotch

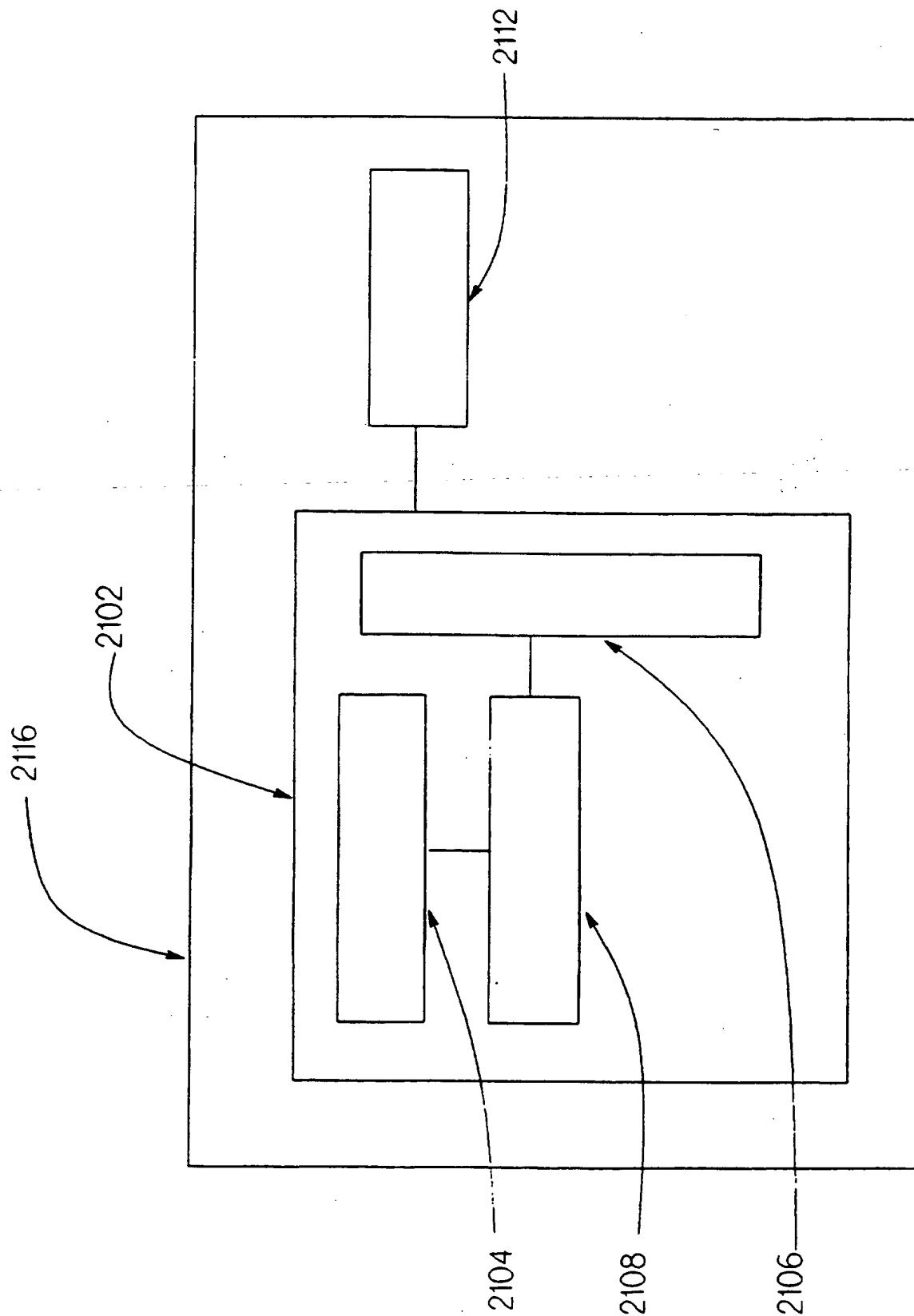
FIG. 13(j)



Frito

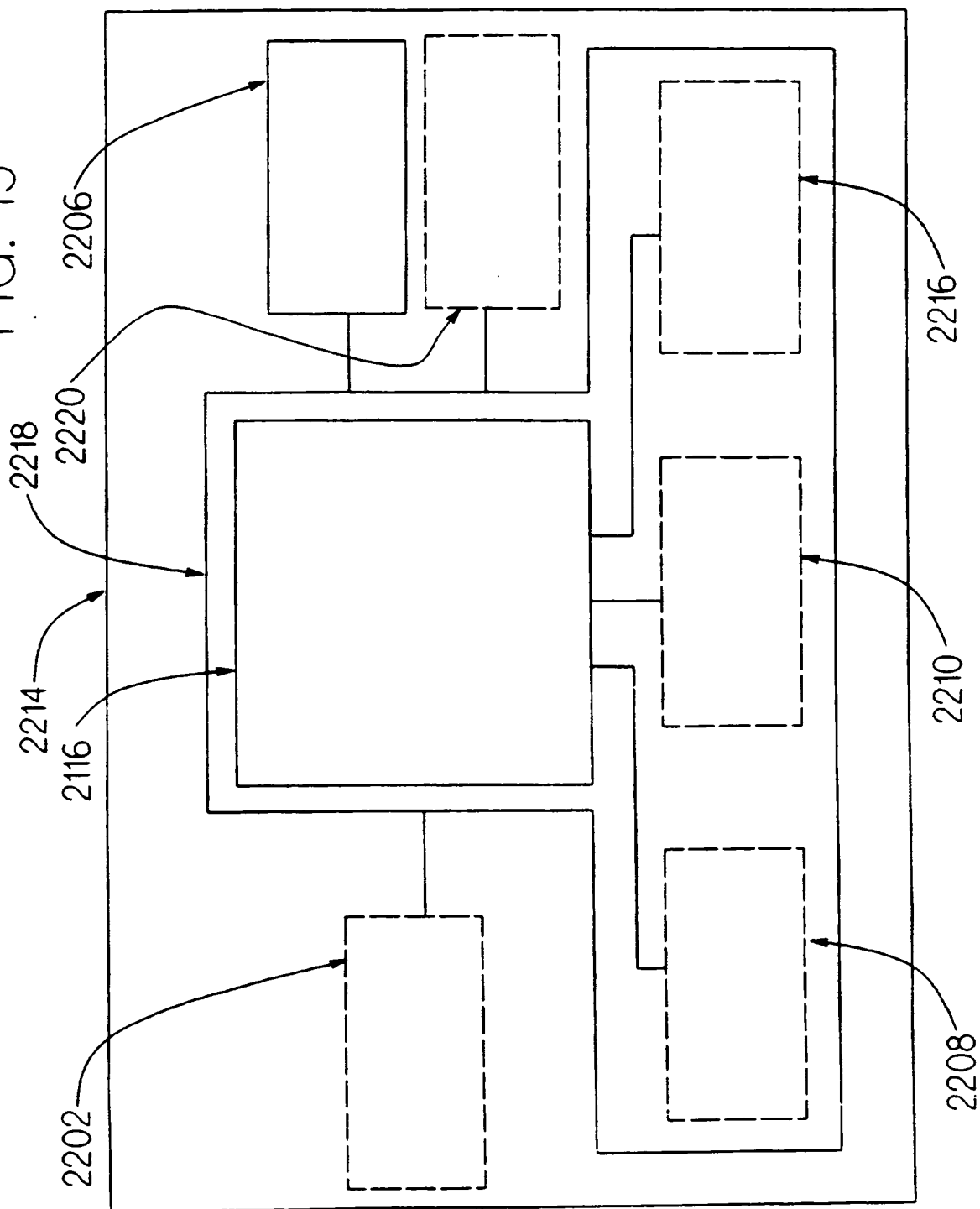
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FIG. 14



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FIG. 15



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FIG. 16

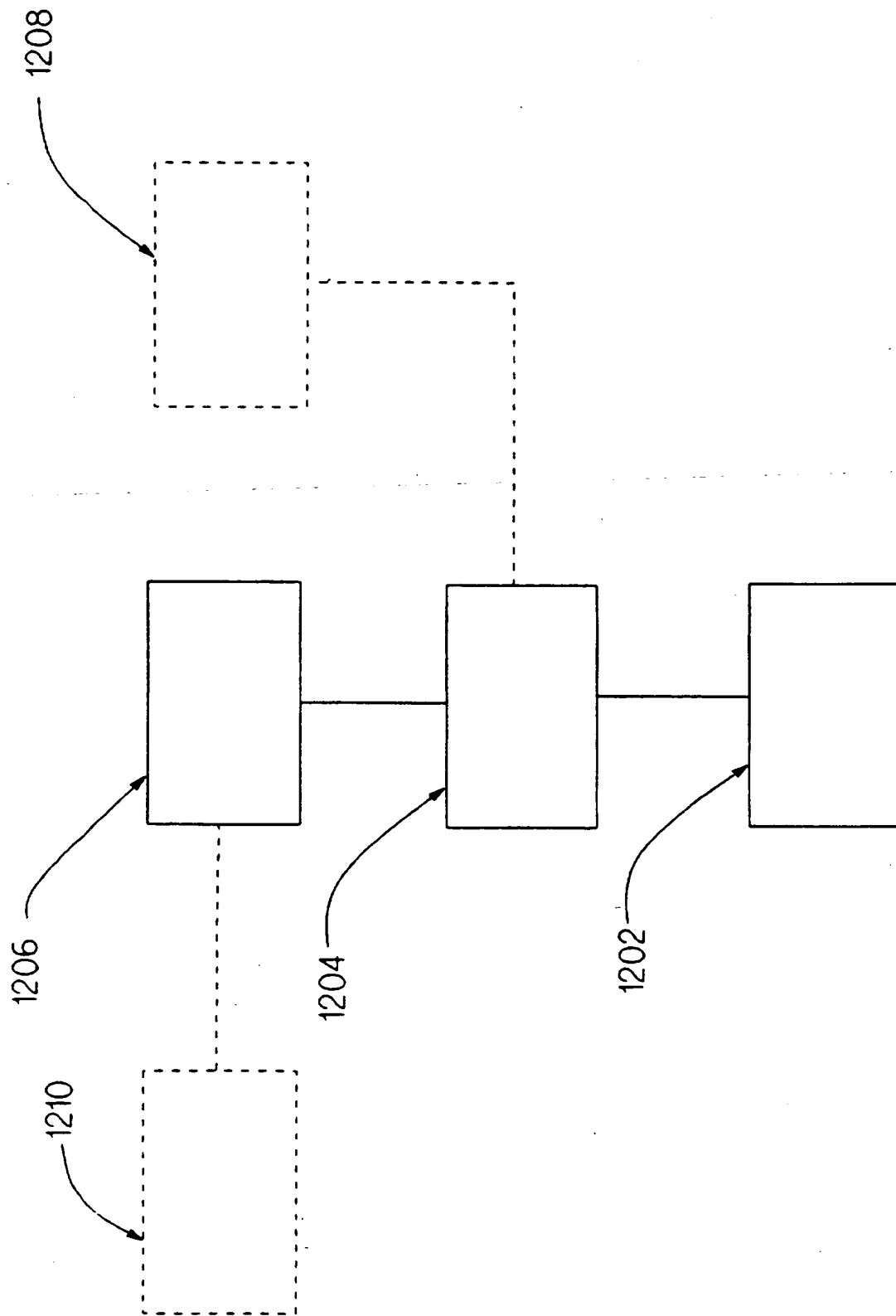
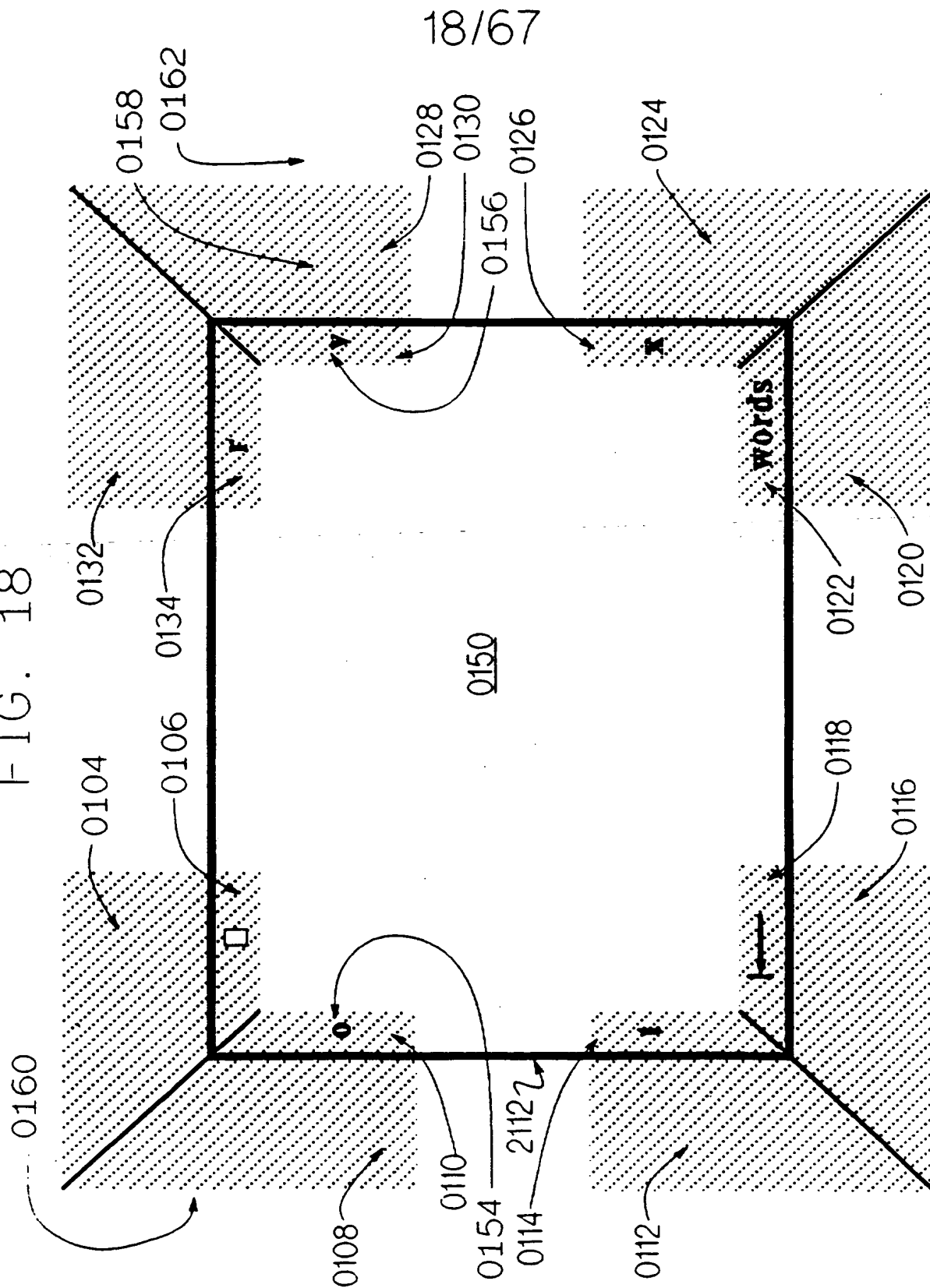
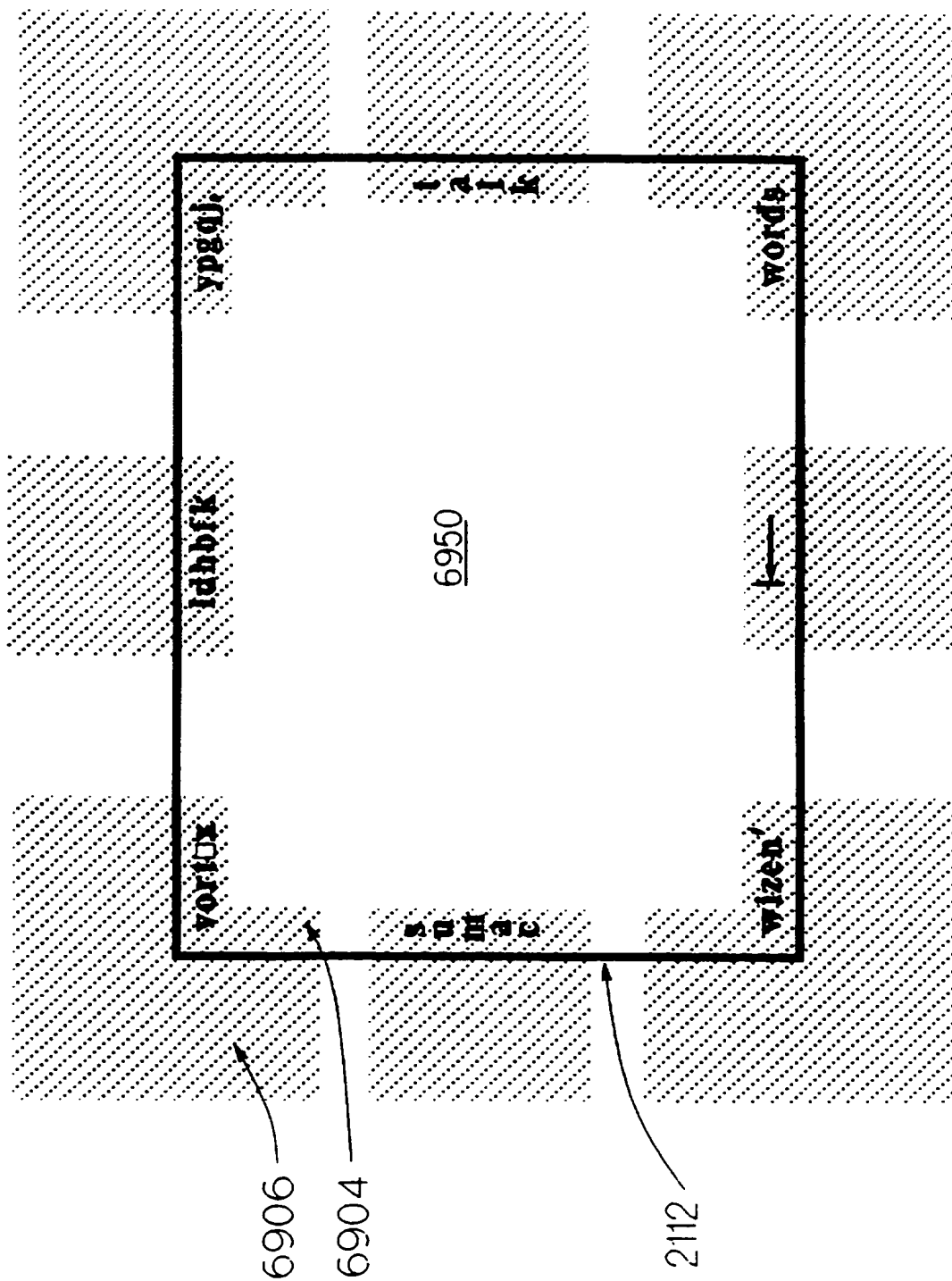


FIG. 18



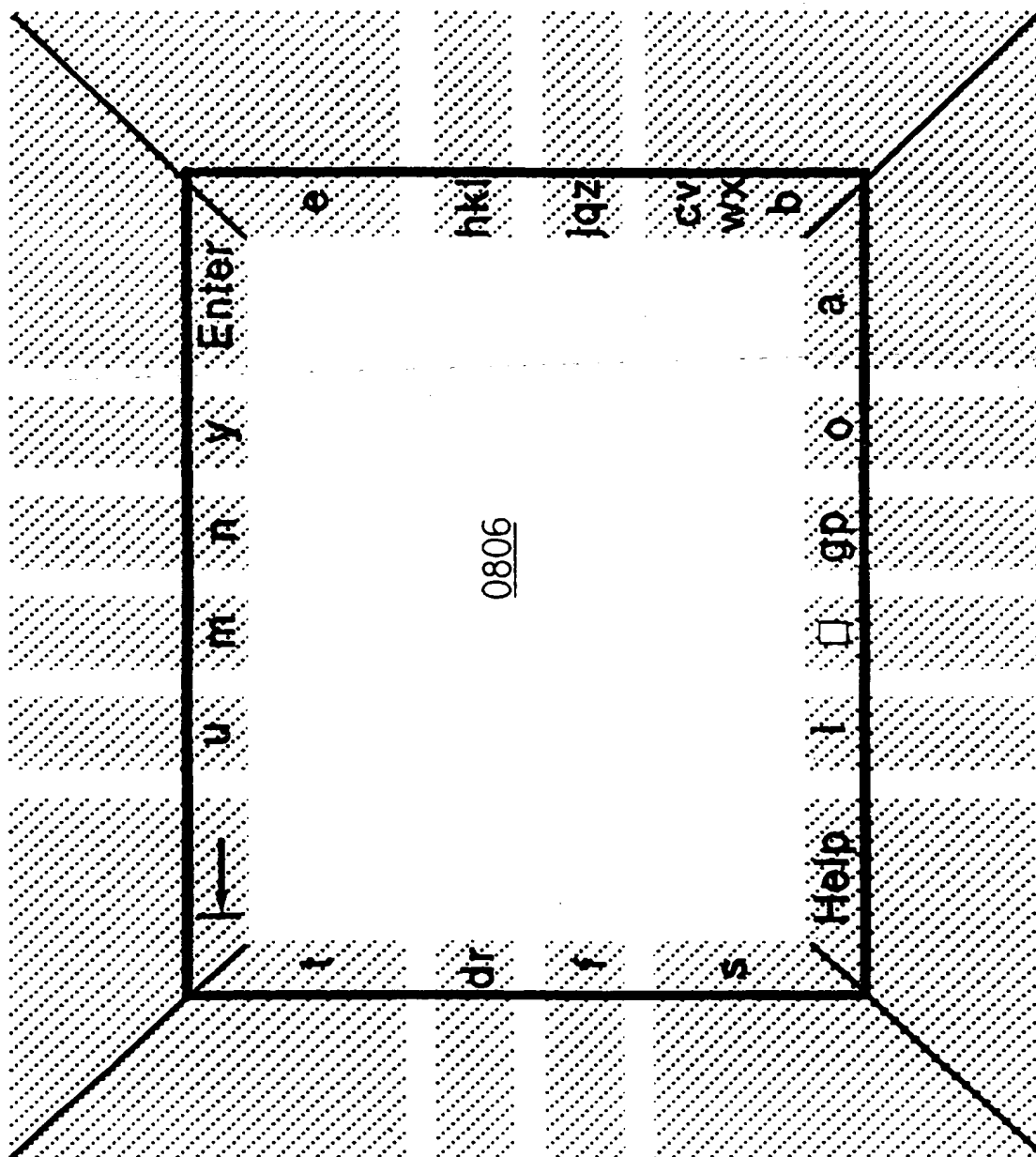
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FIG. 19

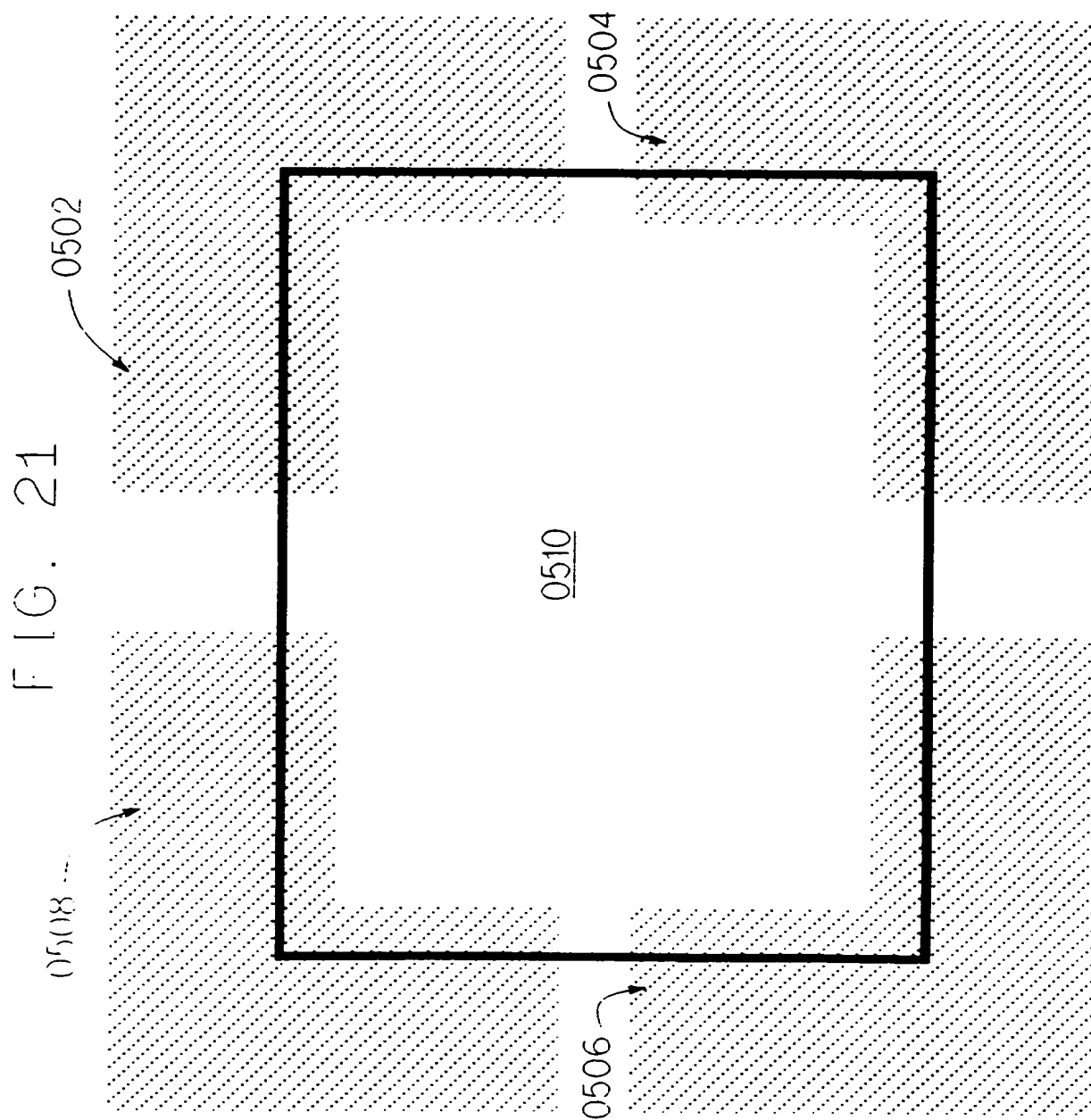


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FIG. 20

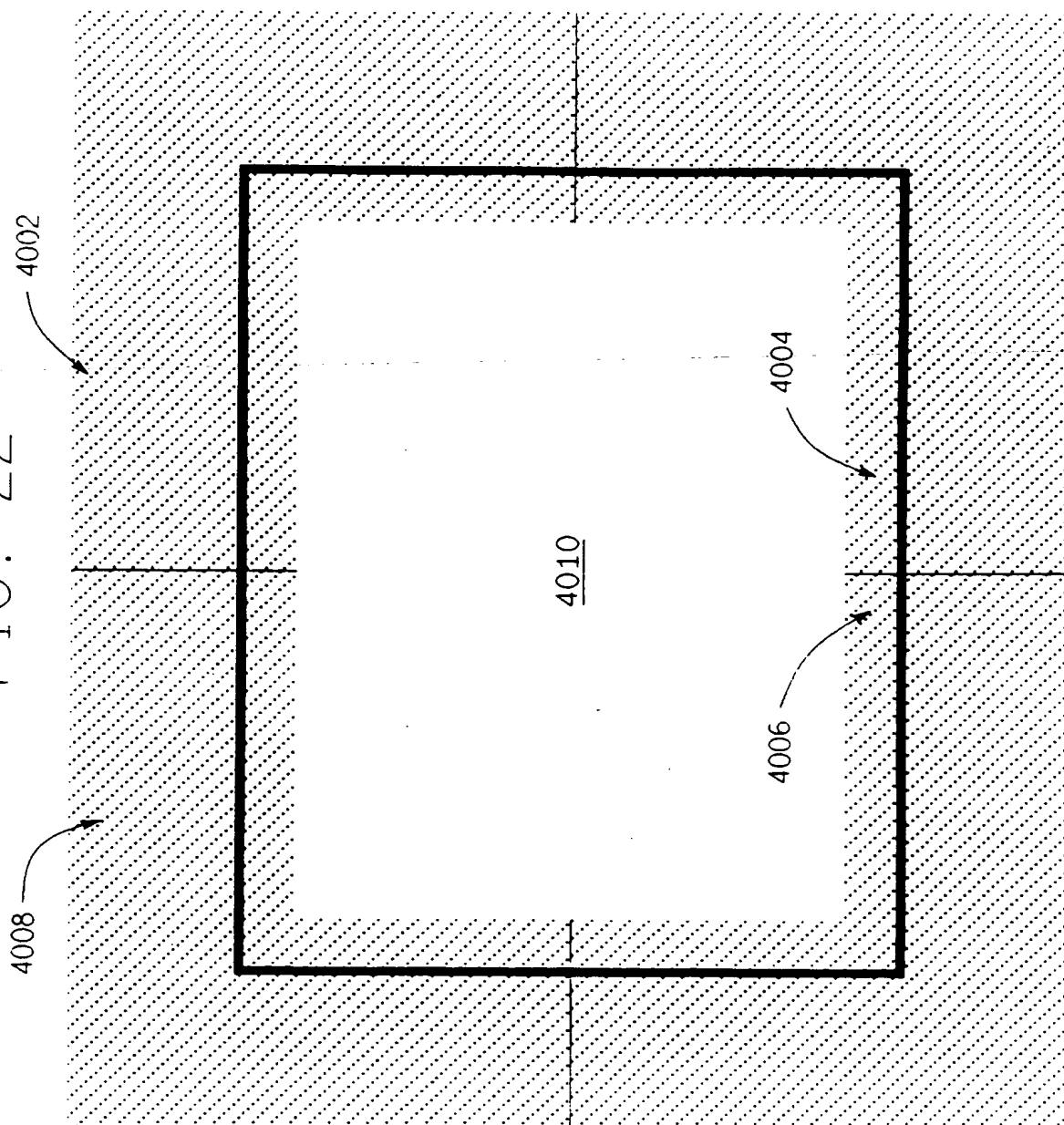


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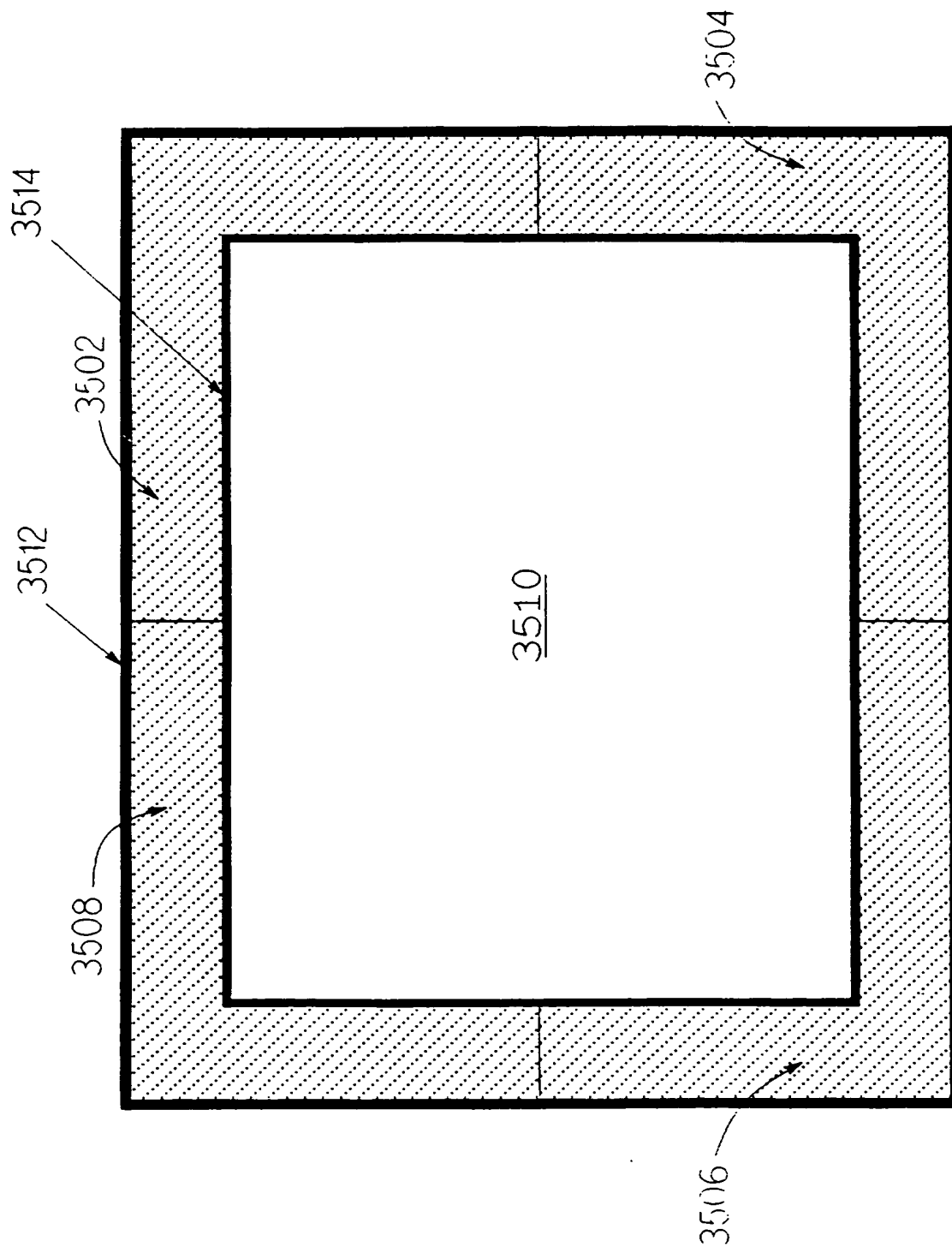
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FIG. 22



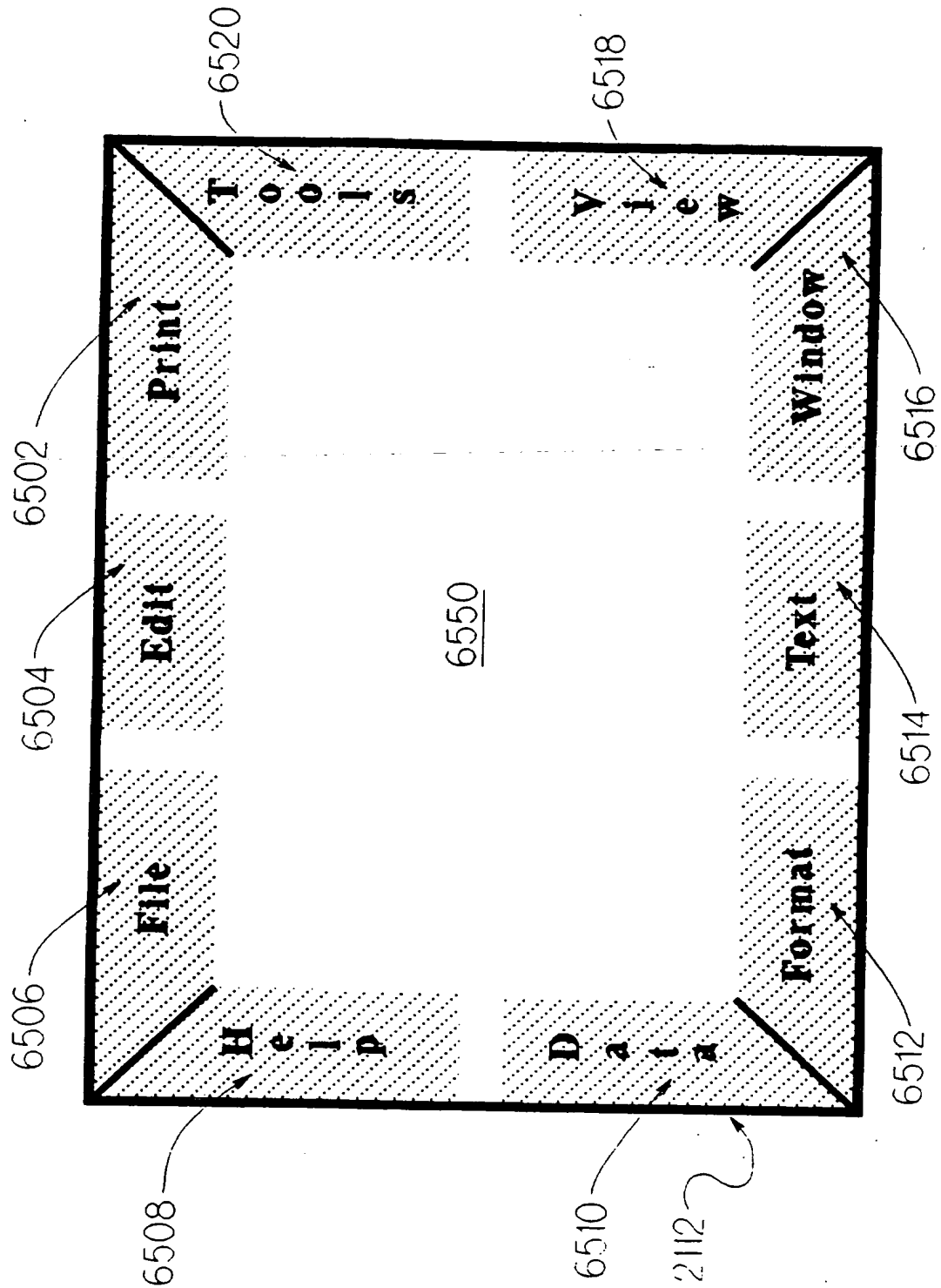
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FIG. 23



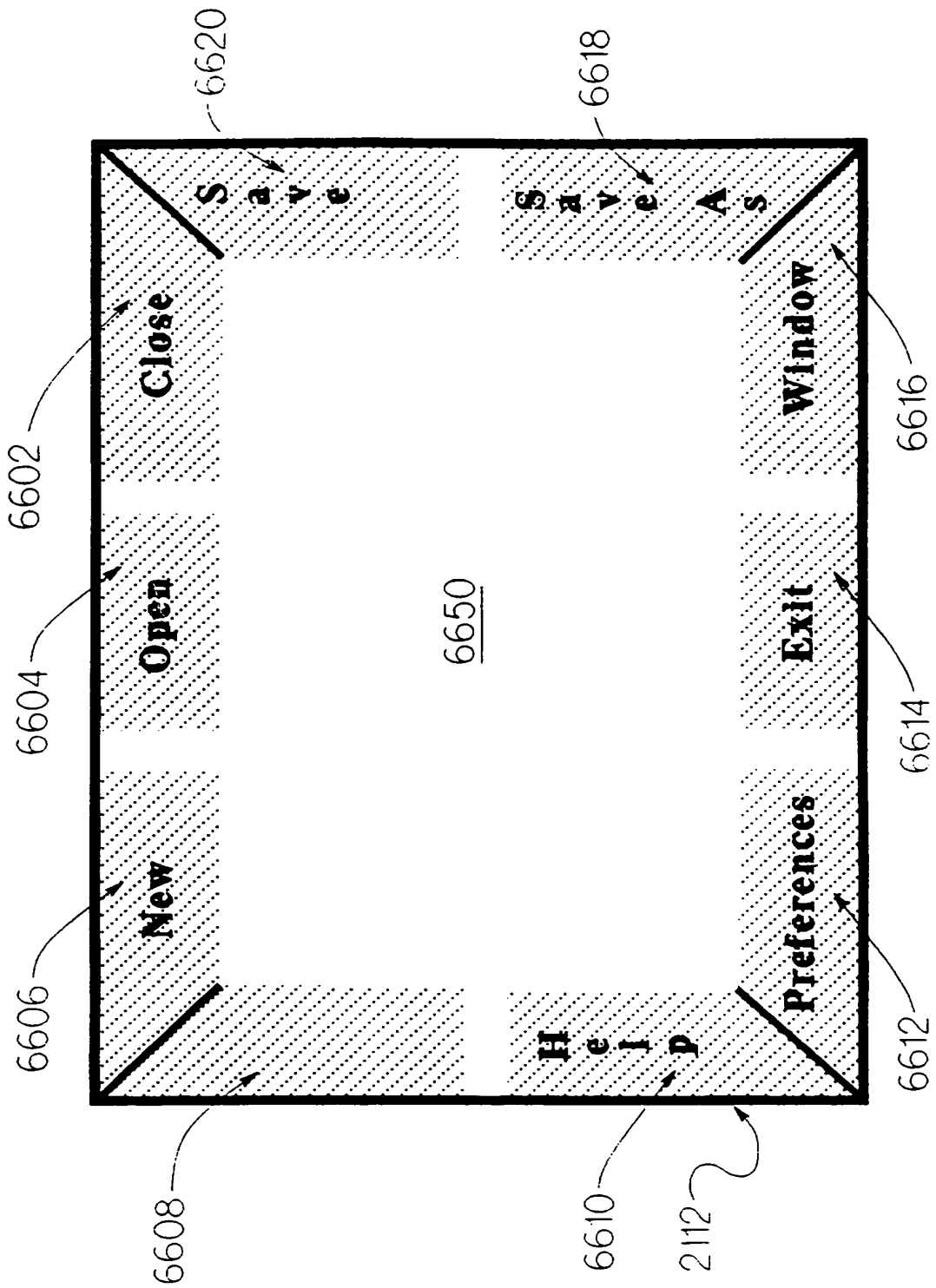
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FIG. 24



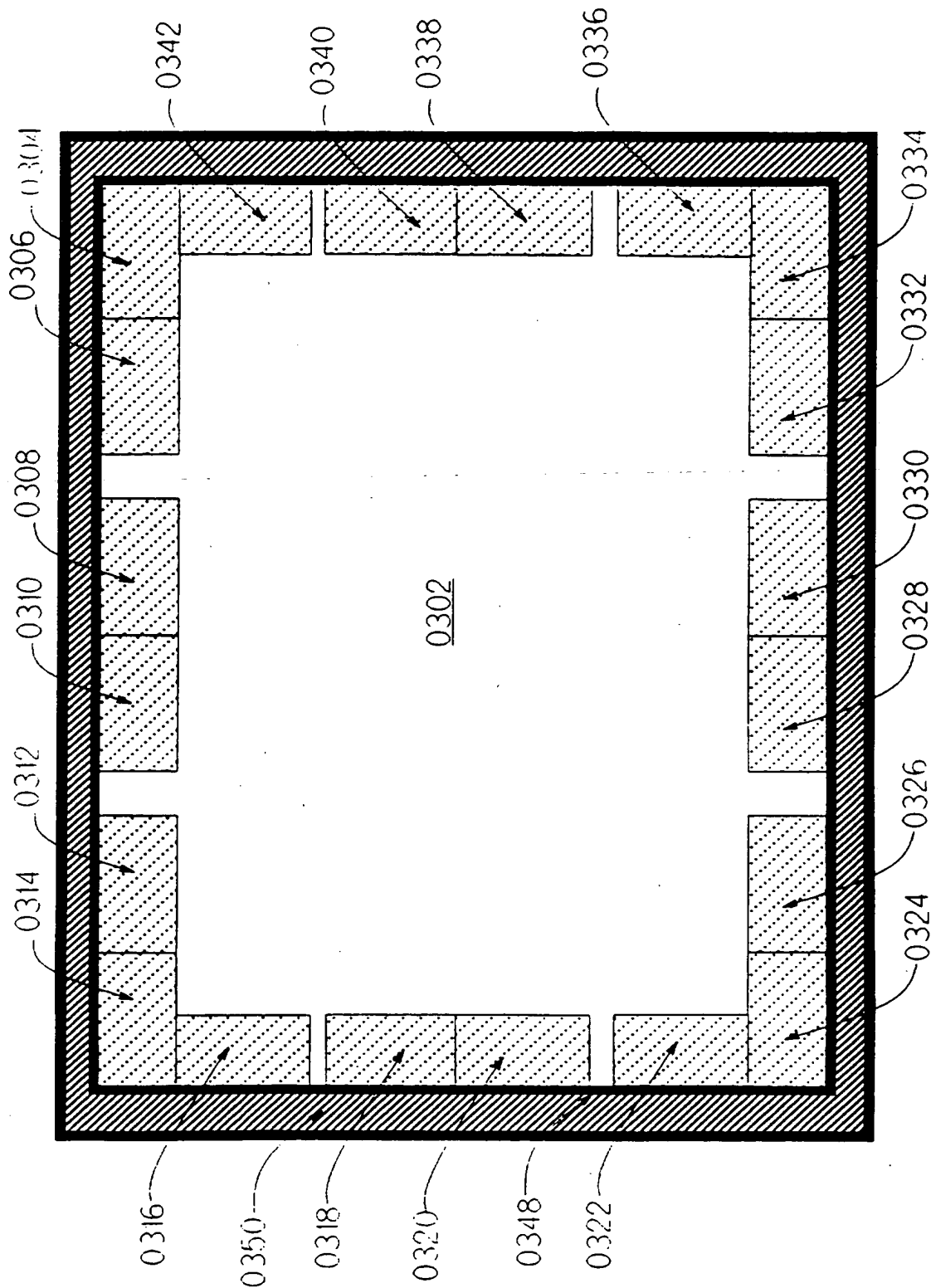
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FIG. 25



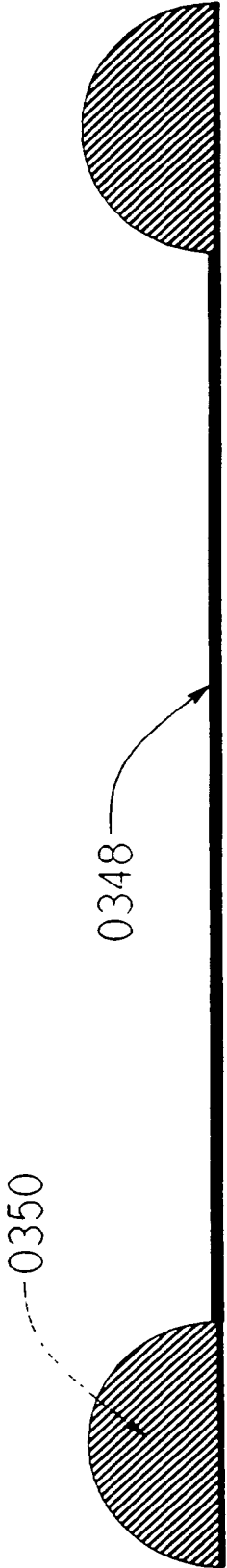
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FIG. 26



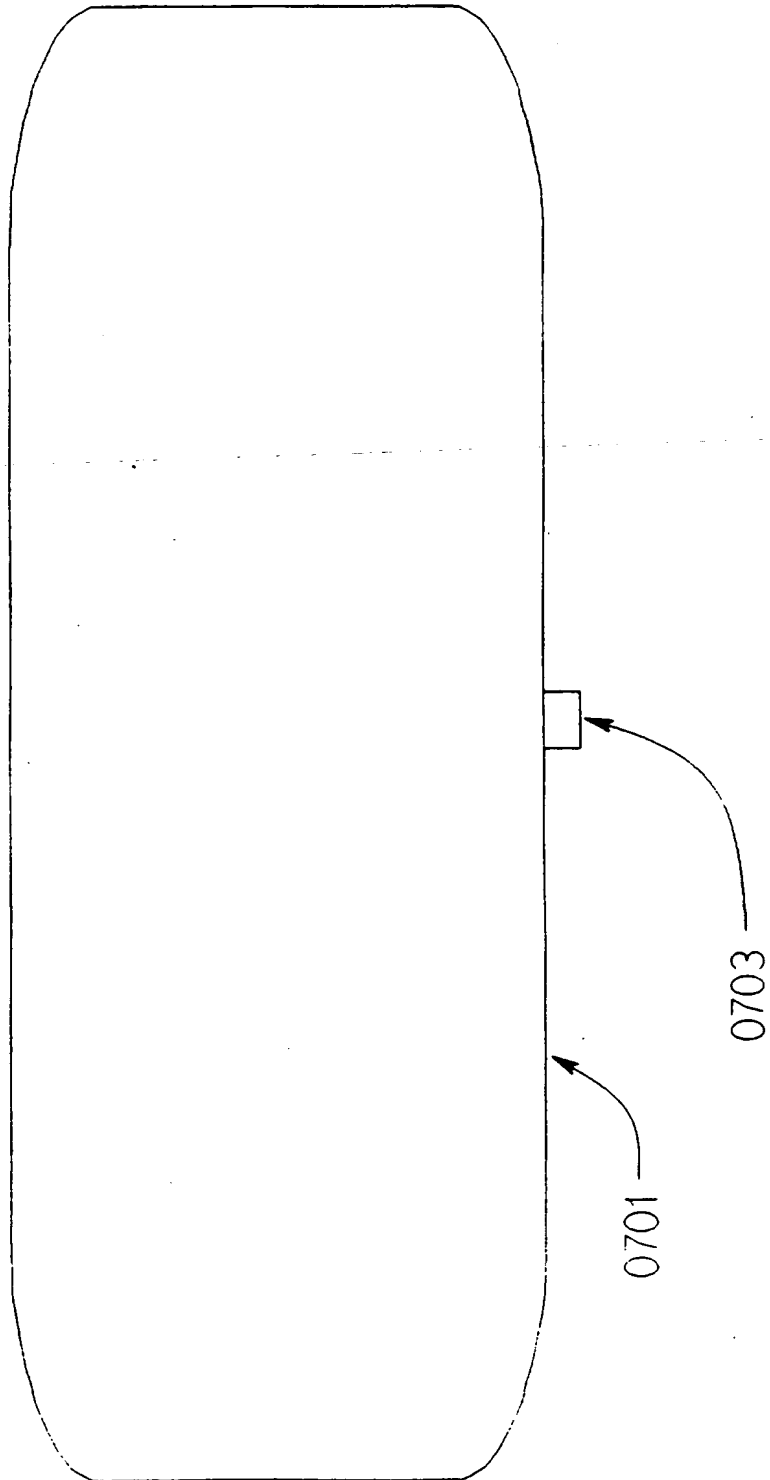
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FIG. 27



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FIG. 28



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[illegible]

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FIG. 30											
		Event									
		0	1	2	3	4	5	6	7	8	9
State		E V N U L L	E V R E S E T	E V D E C A Y	E V D W E L L	E V C R O S S O U T	E V S T E P D O W N	E V S T E P U P	E V M O V E M E N T	E V I D L E T I M E O U T	E V C E I L I N G
10	ST_IDLE	3	0	0	0	0	0	0	0	0	0
11	ST_SELECTED_SEQ_ON	0	3	0	0	0	0	0	0	0	0
12	ST_EBB_TIDE	12	3	8	13	12	0	5	8	10	0
13	ST_ENTRY	4	0	0	0	0	0	0	0	0	0
14	ST_BEGIN_TO_LOCK	0	3	15	15	15	0	0	15	10	15
15	ST_LOCK	16	3	15	15	15	0	0	15	10	15
16	ST_END_LOCK	0	3	17	17	7	0	0	17	10	17
17	ST_DISCARD	0	0	0	0	0	0	0	0	0	0

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FIG. 31

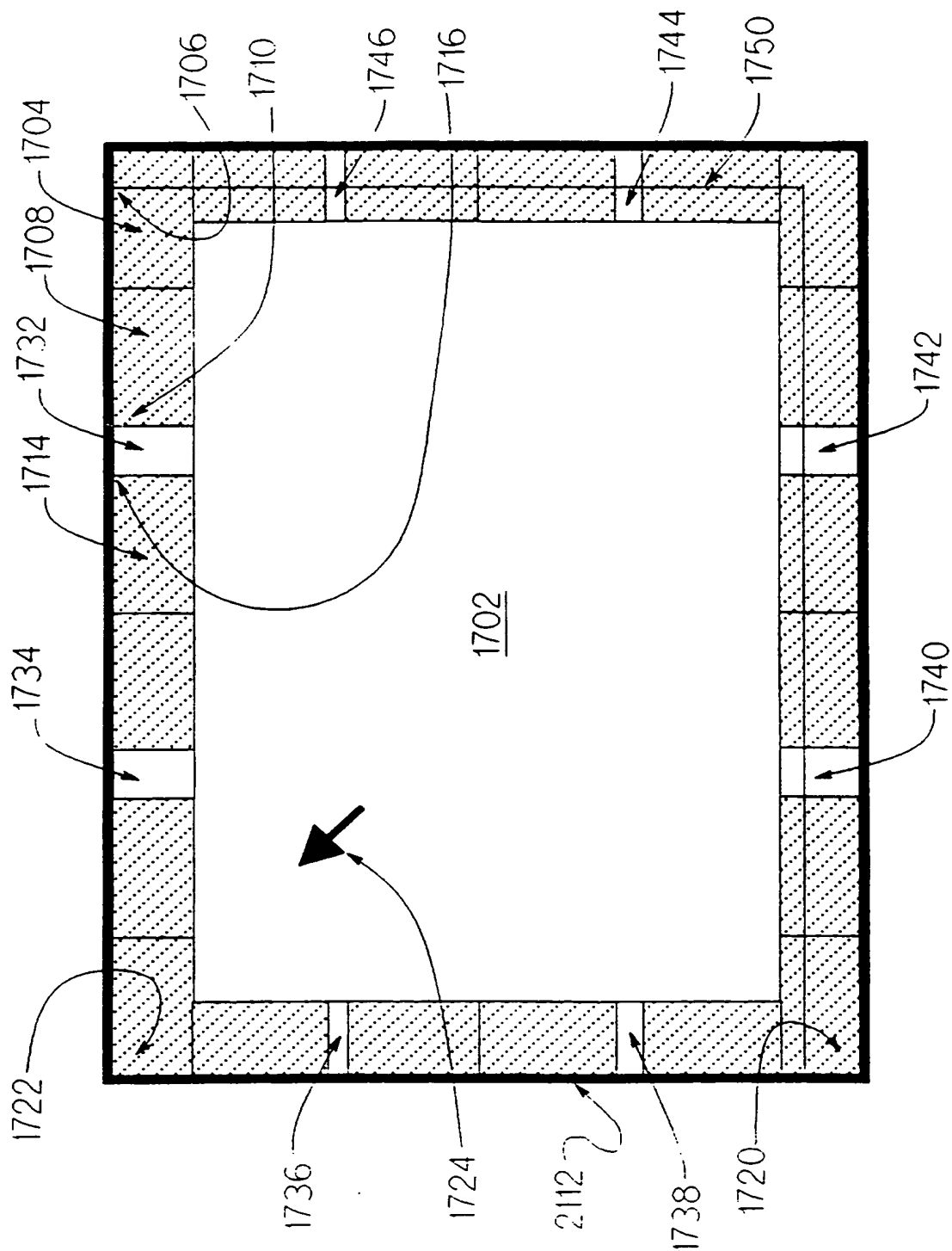


FIG. 32

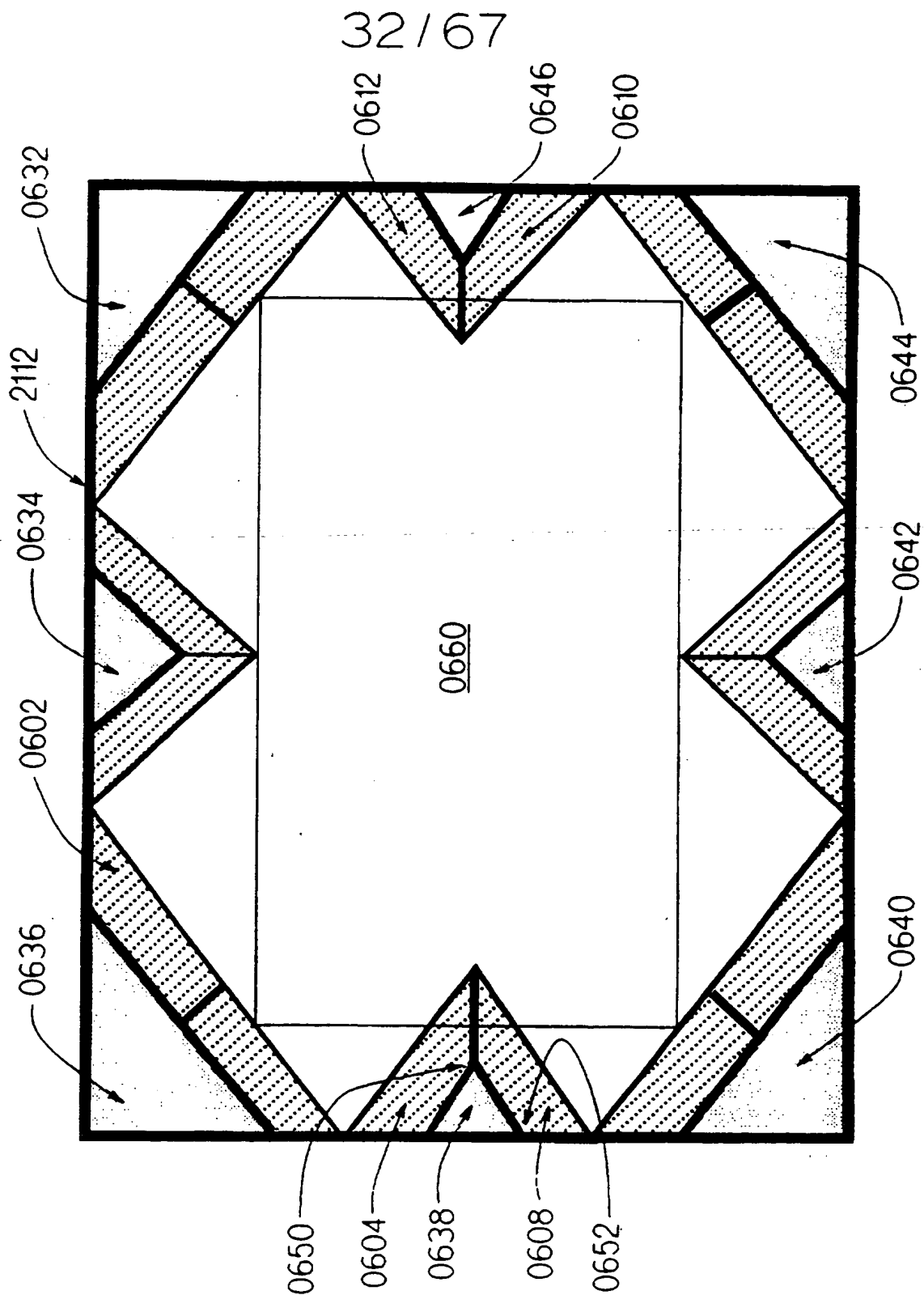


FIG. 33

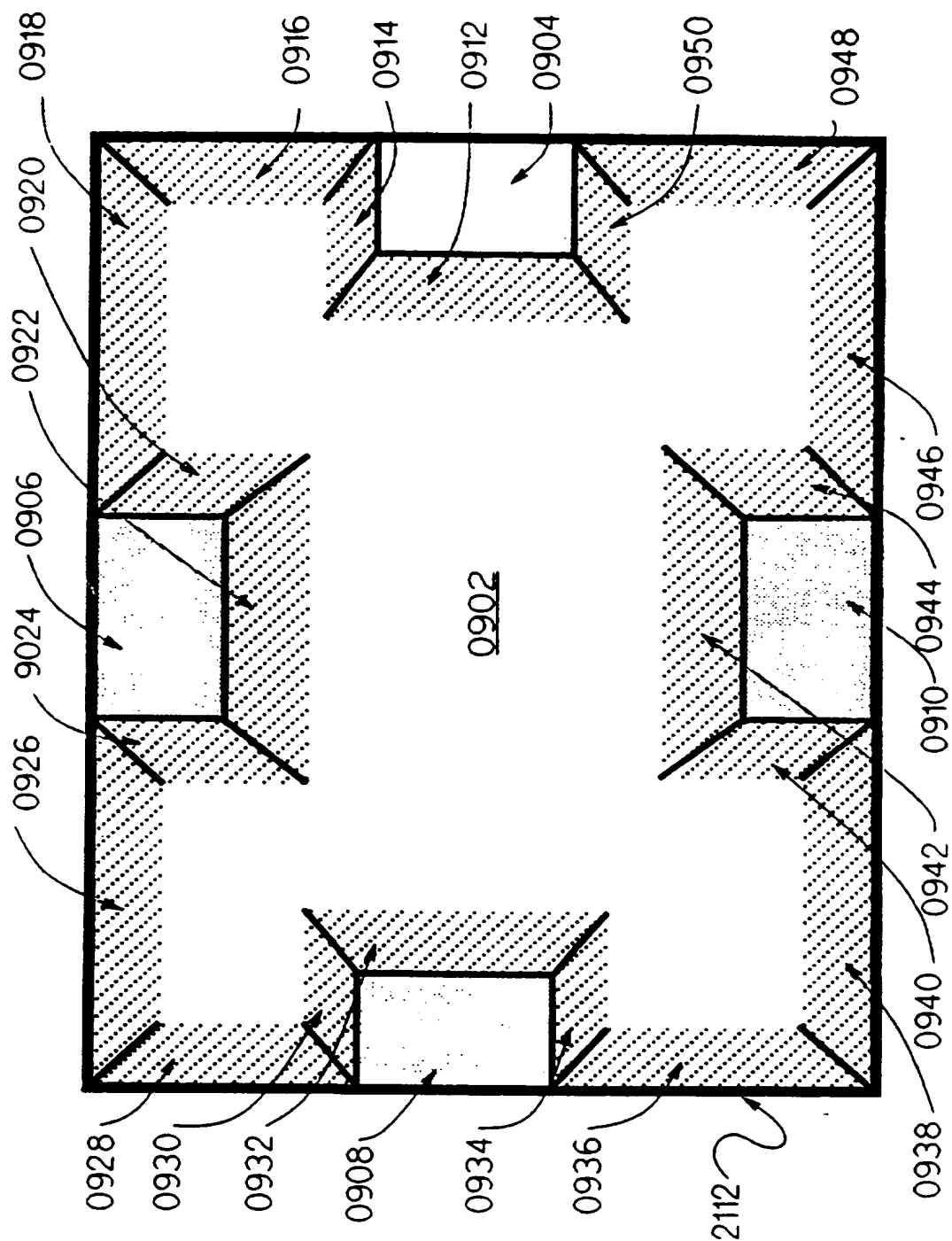


FIG. 34

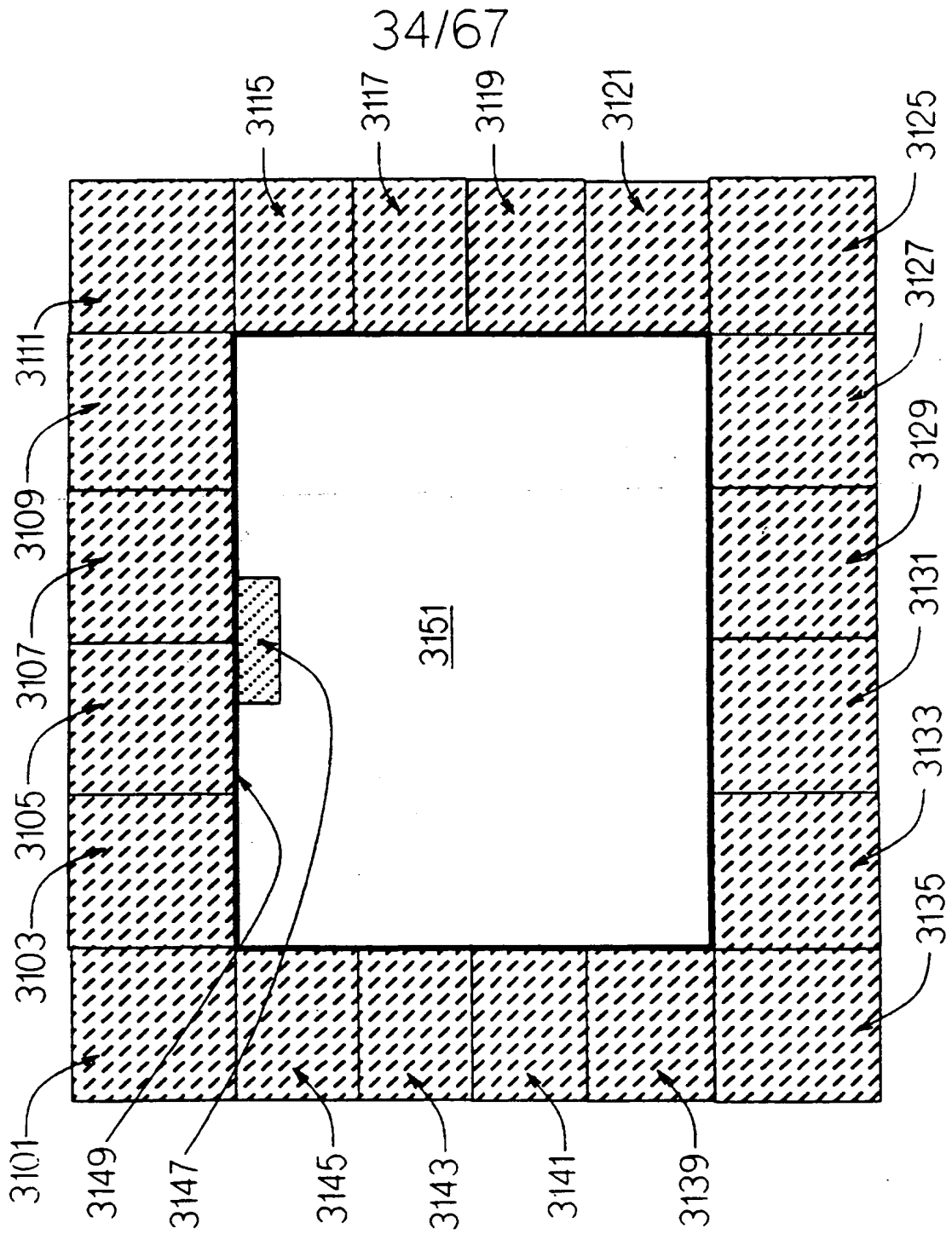
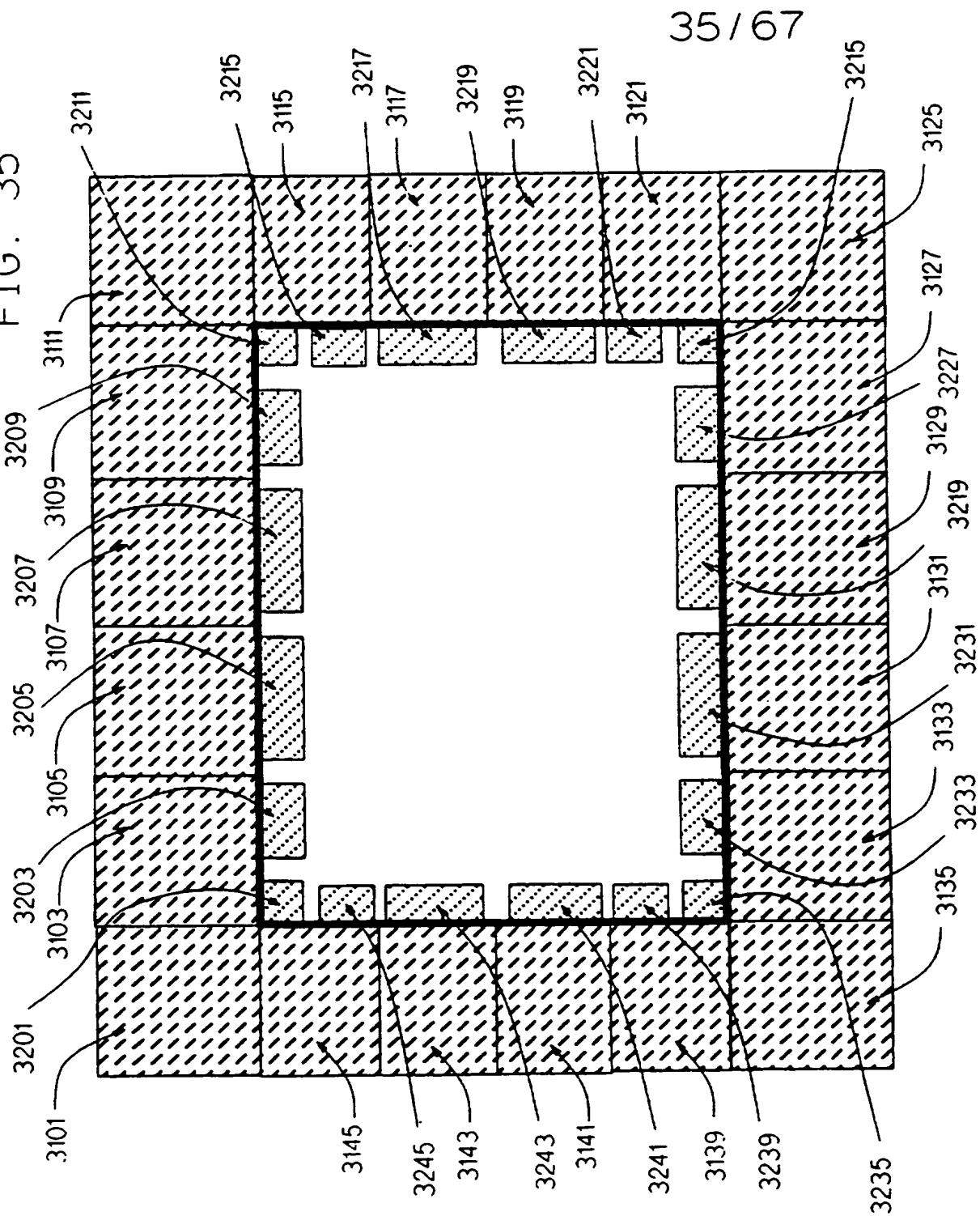
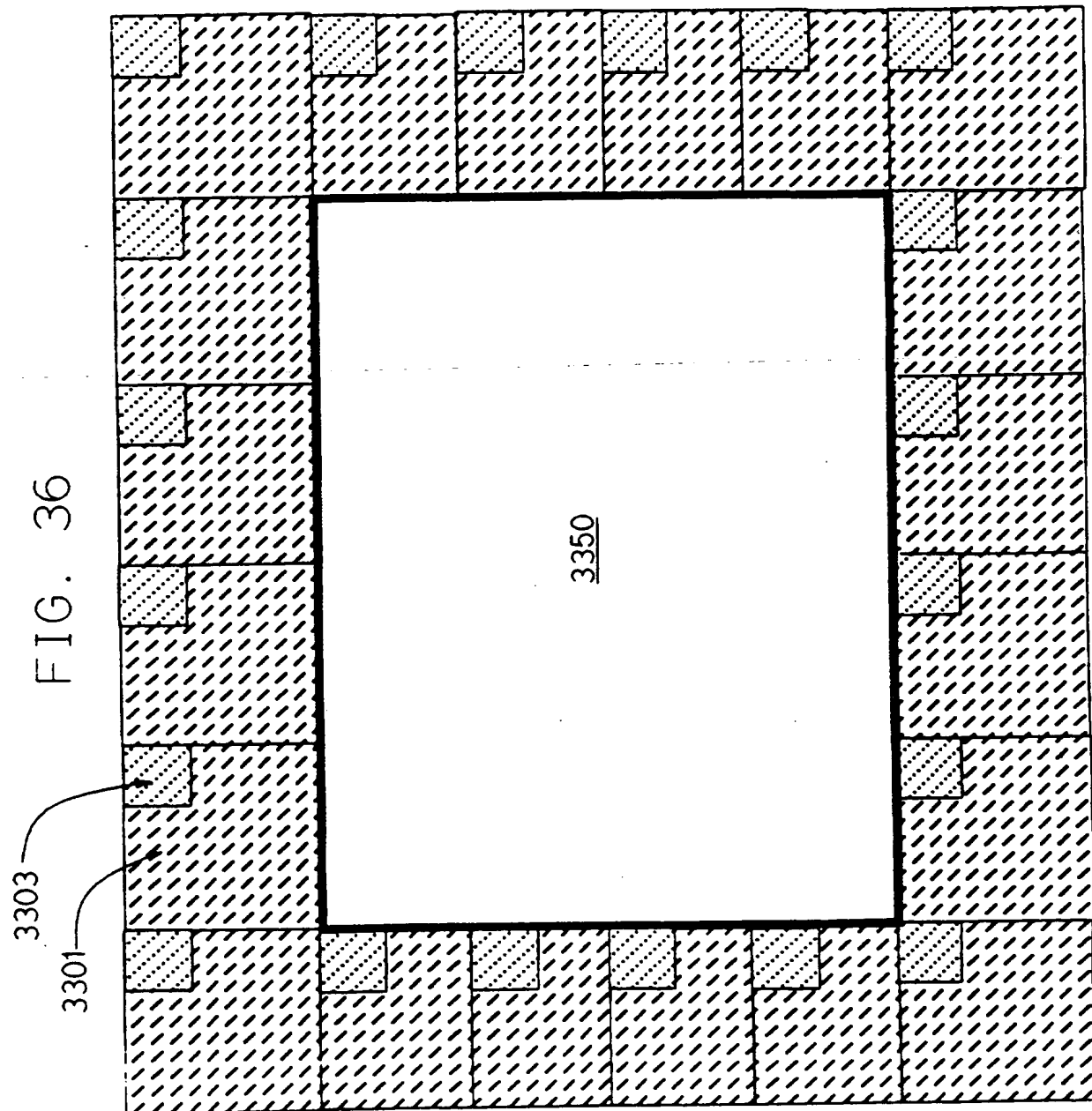


FIG. 35

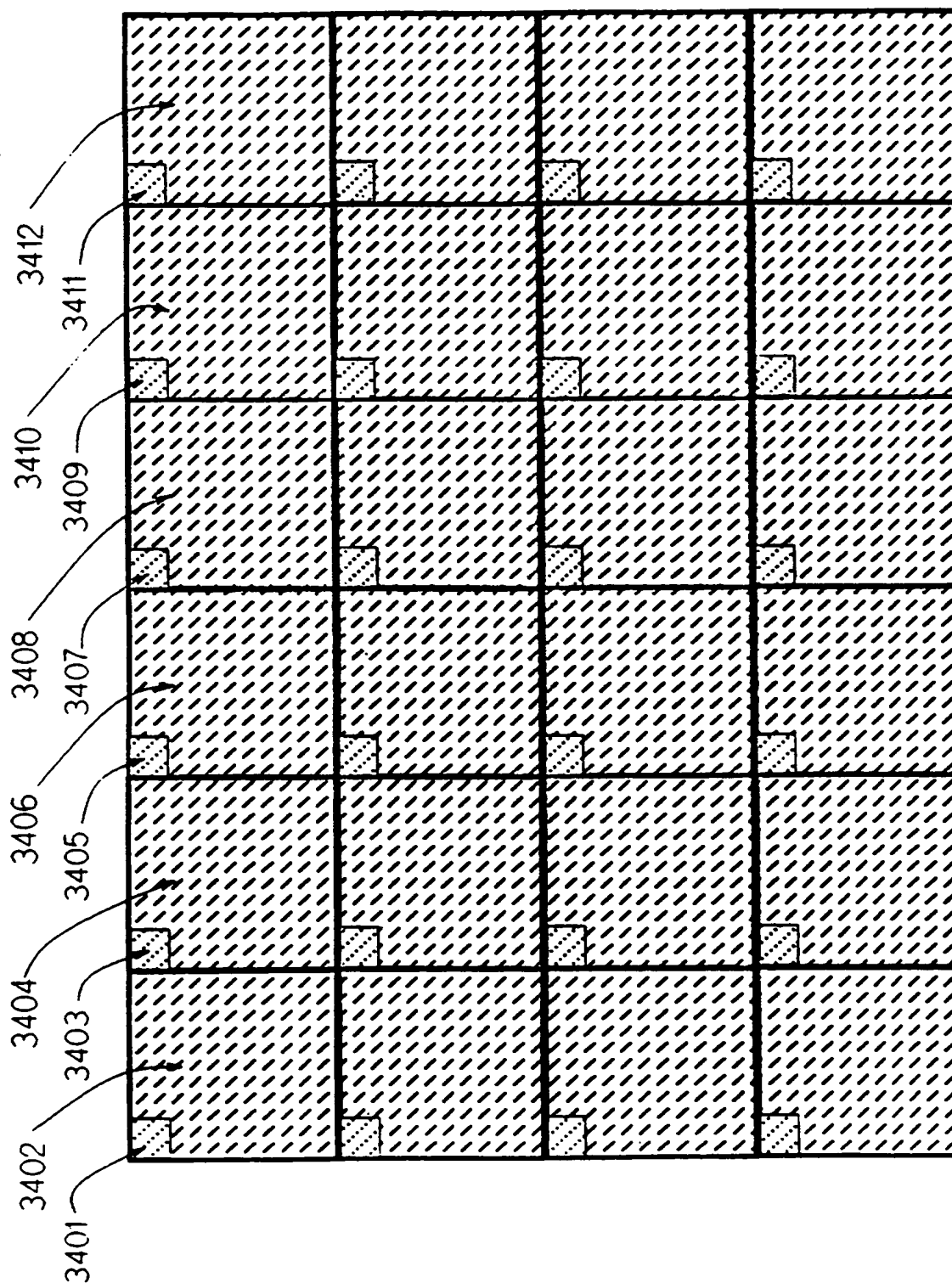


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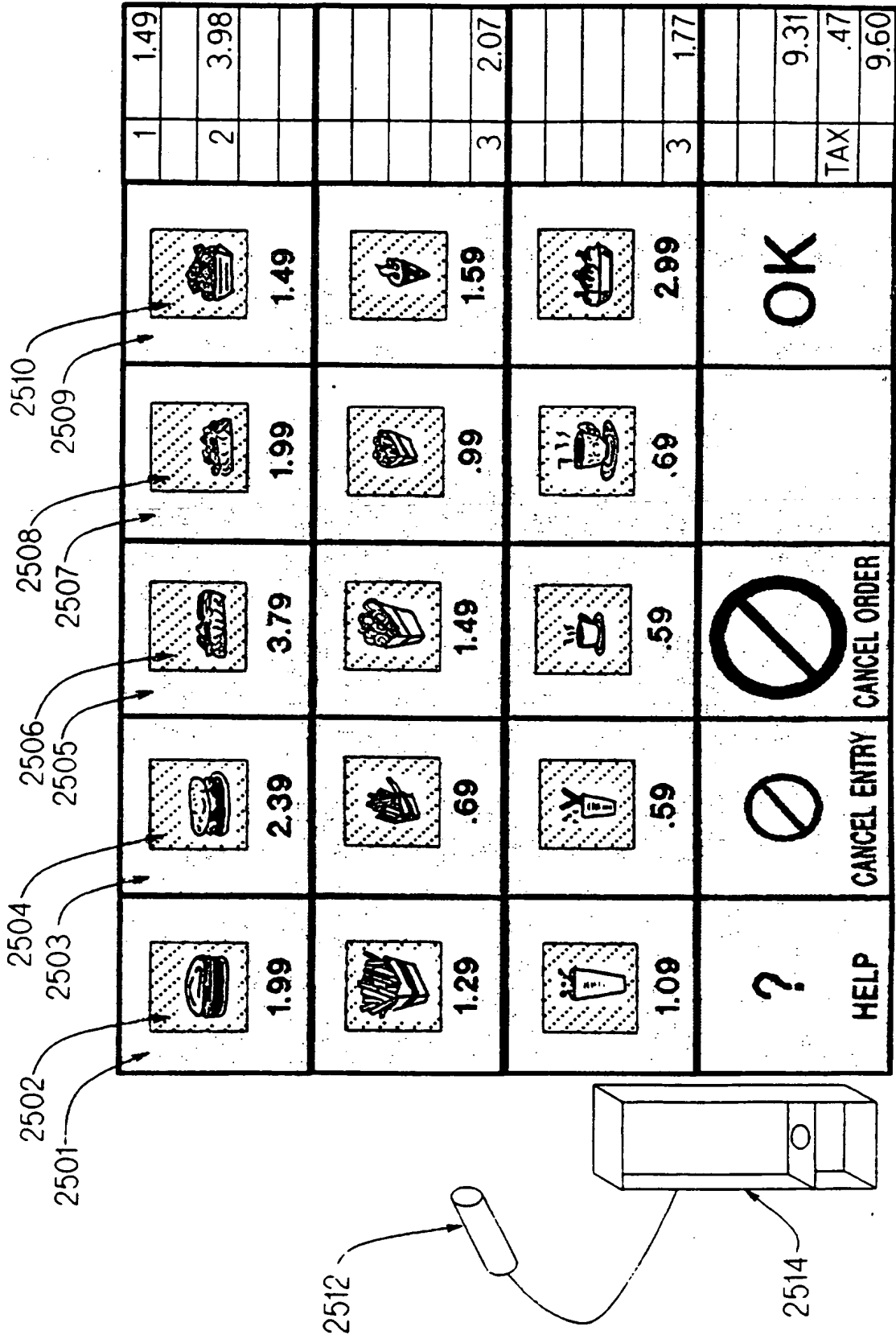
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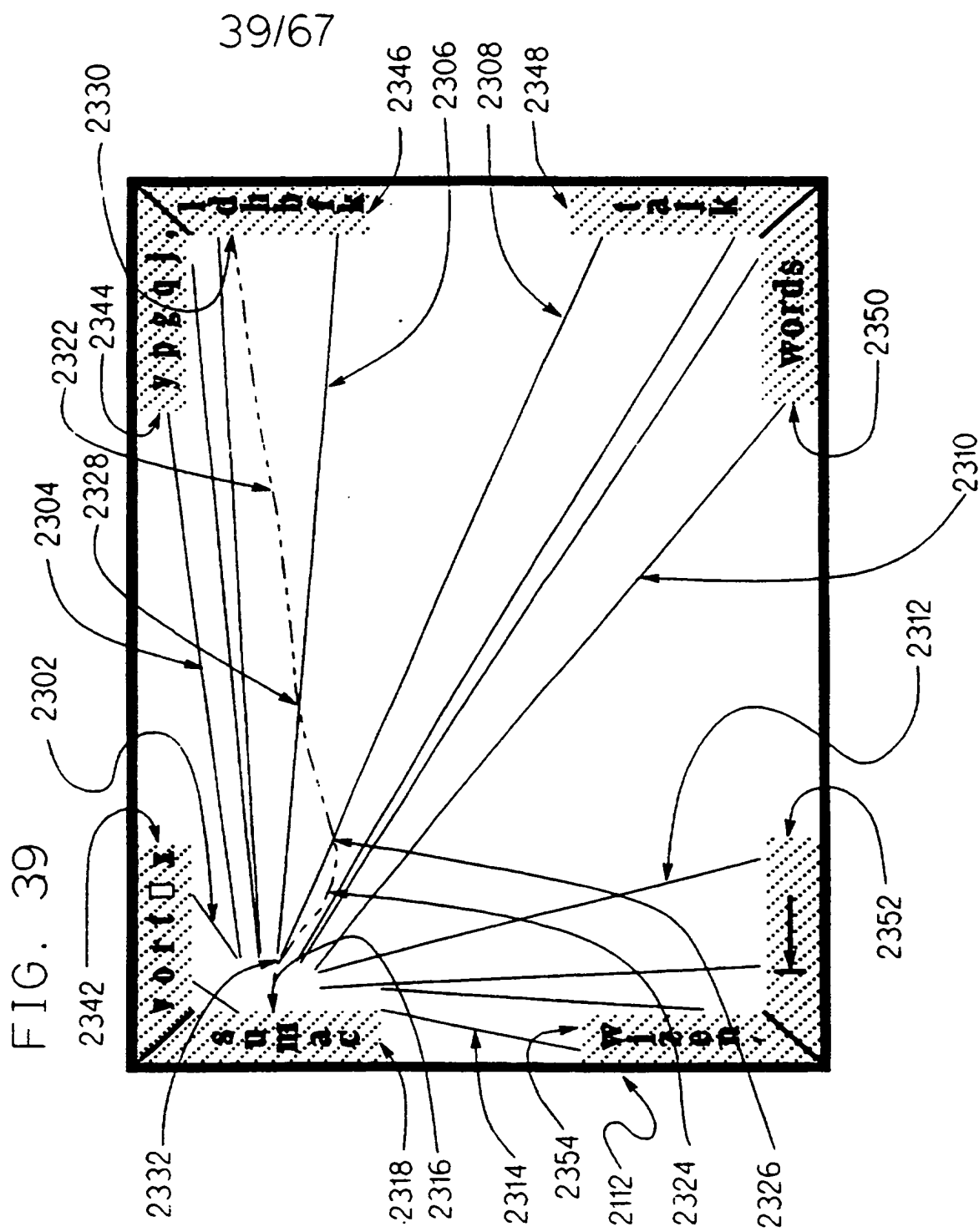
FIG. 37



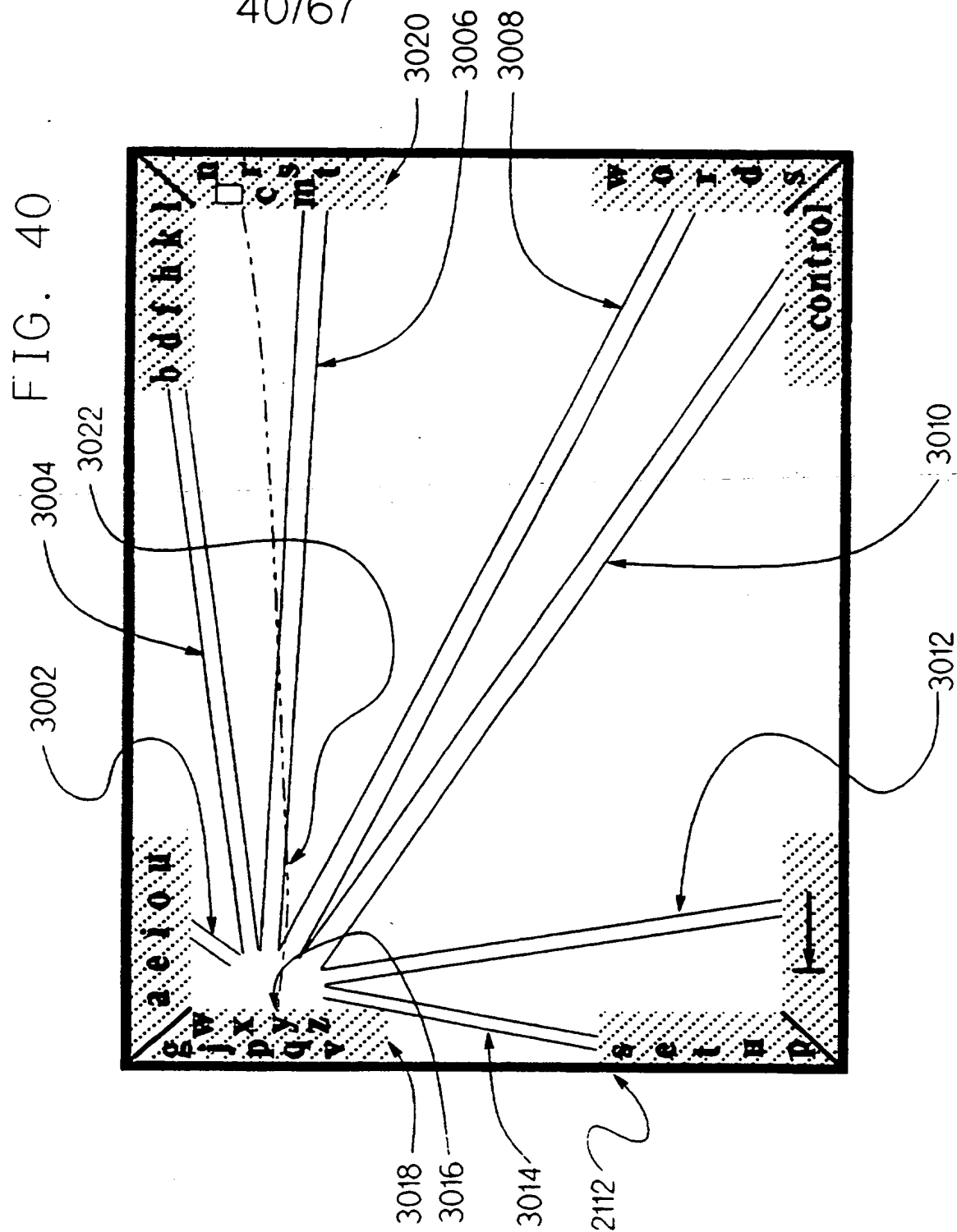
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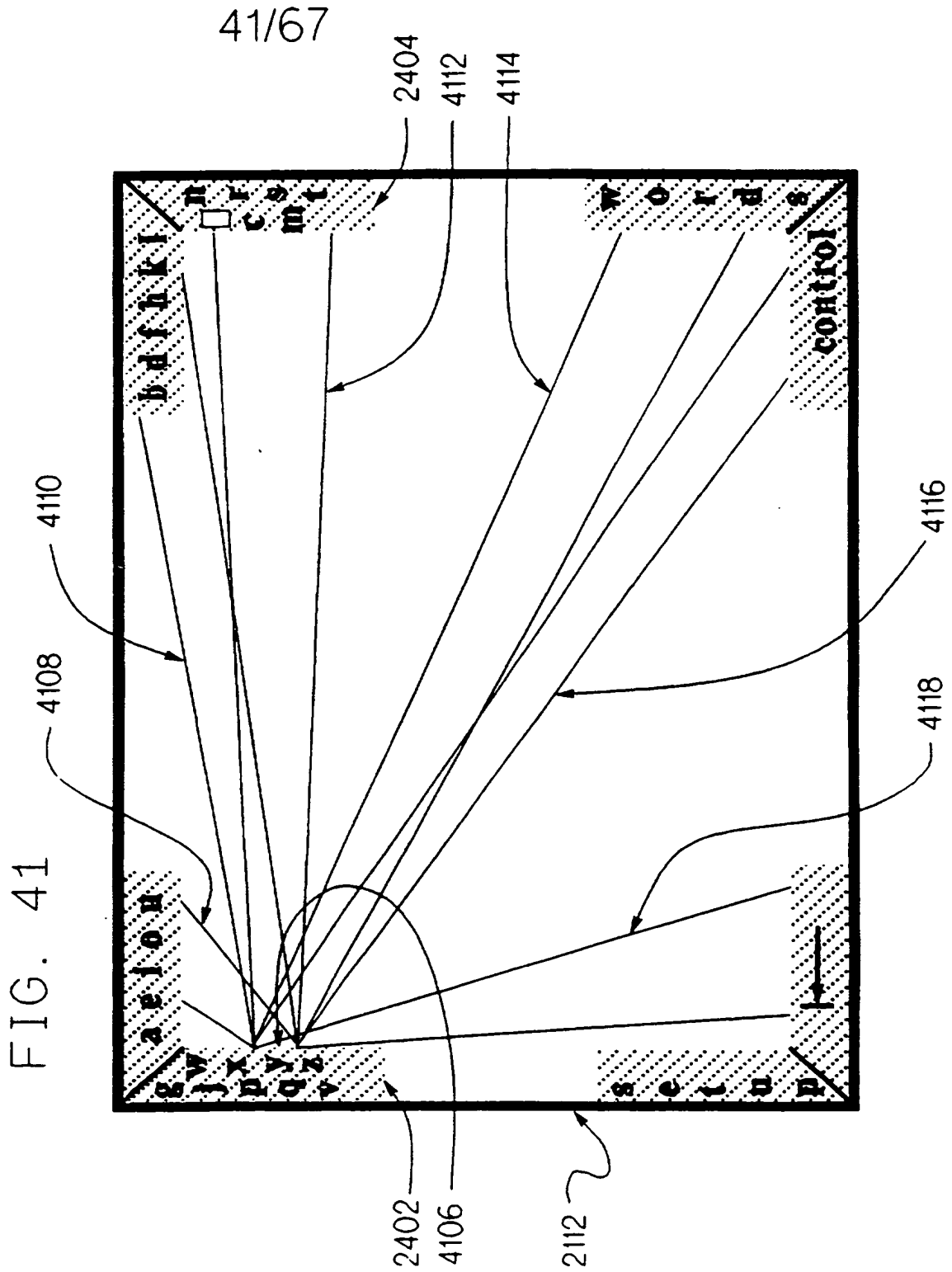
FIG. 38





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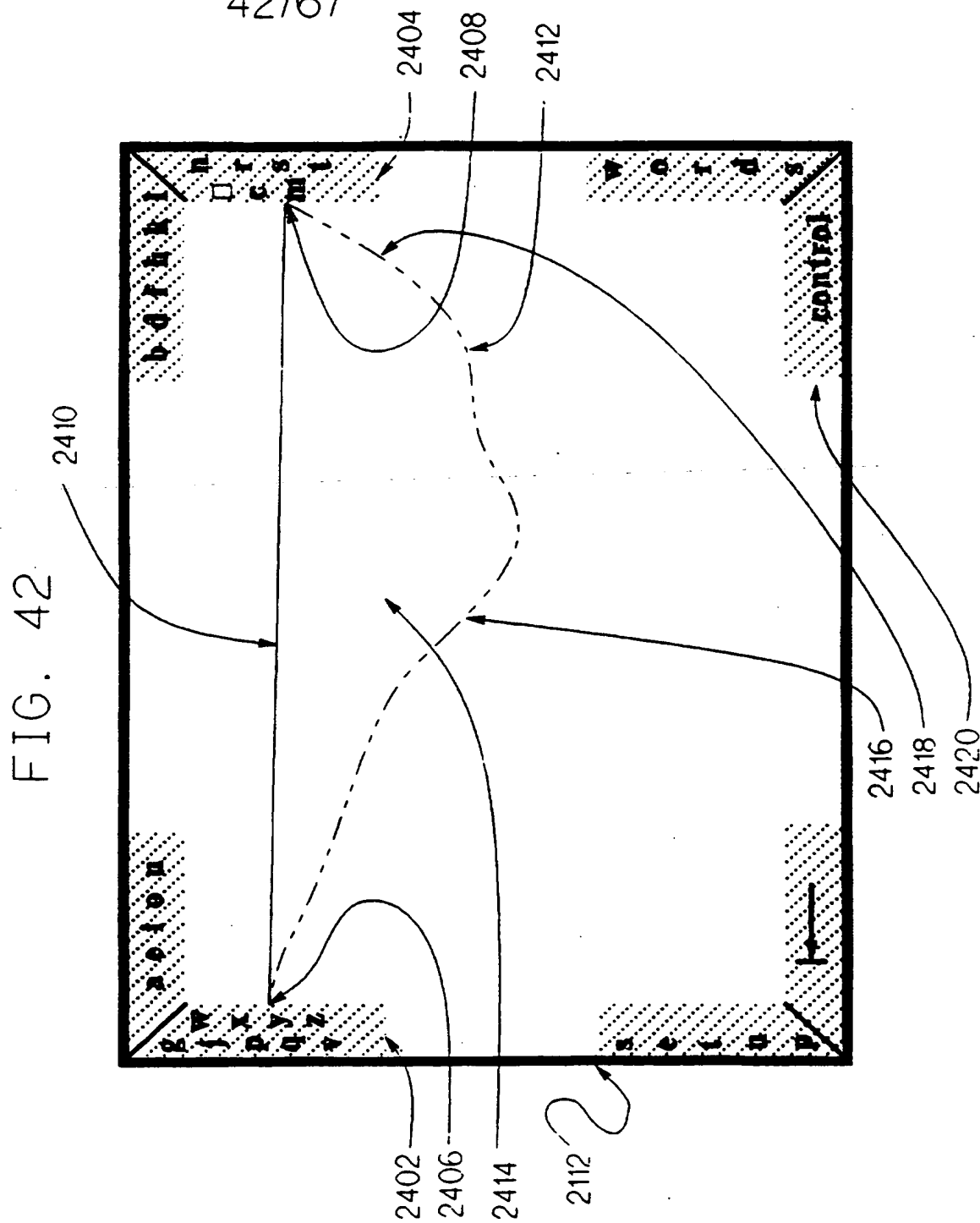
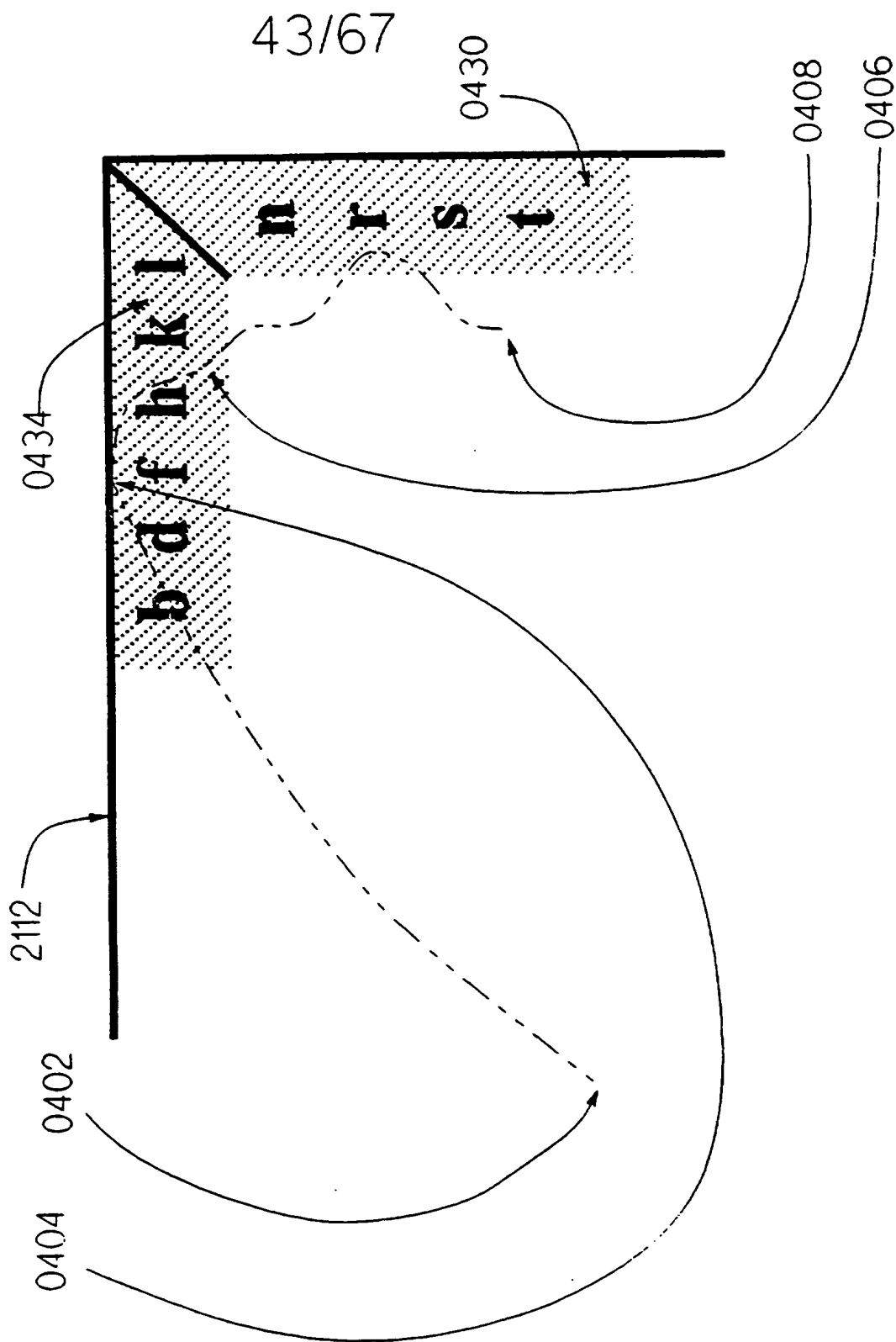
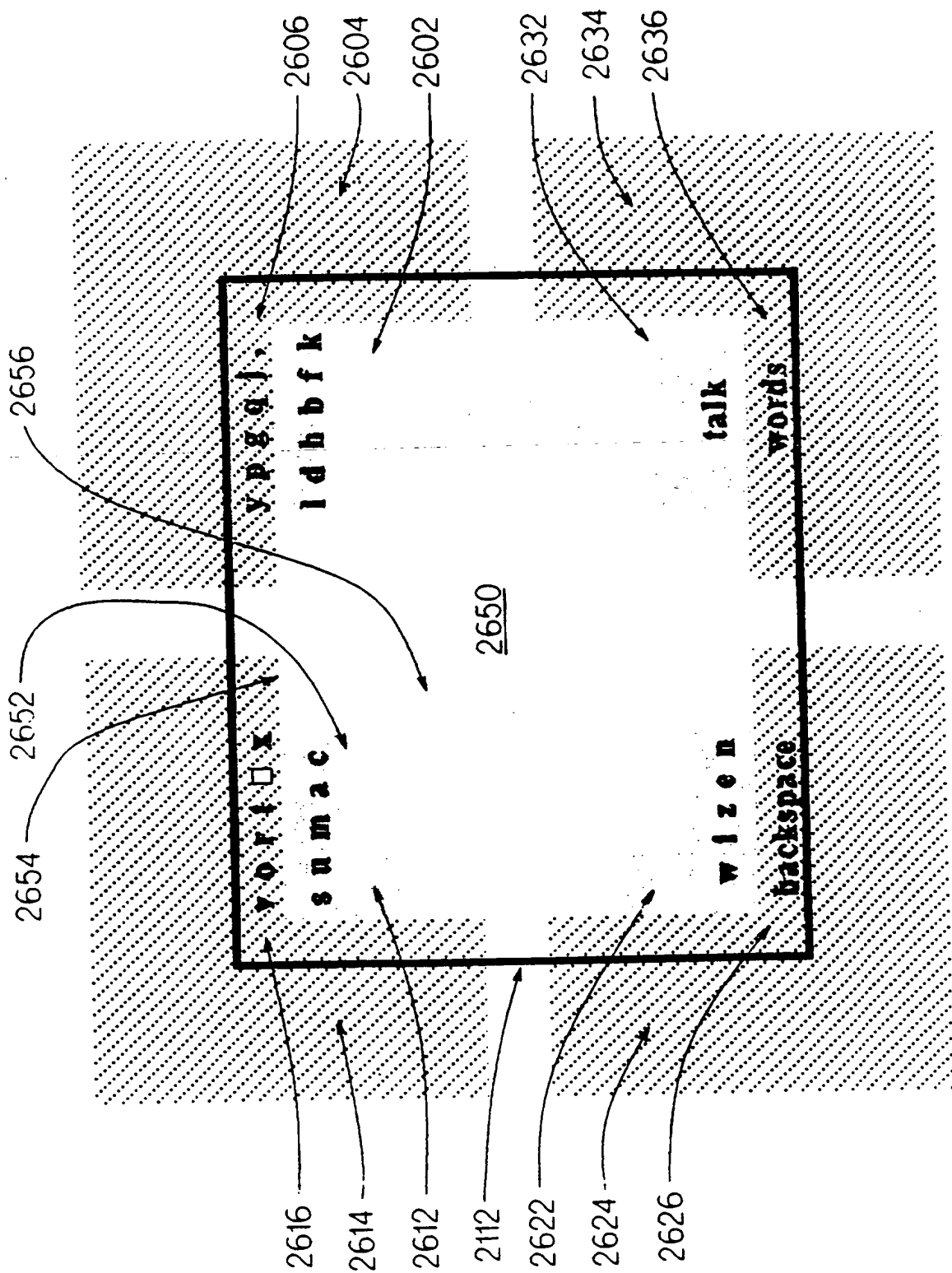


FIG. 43



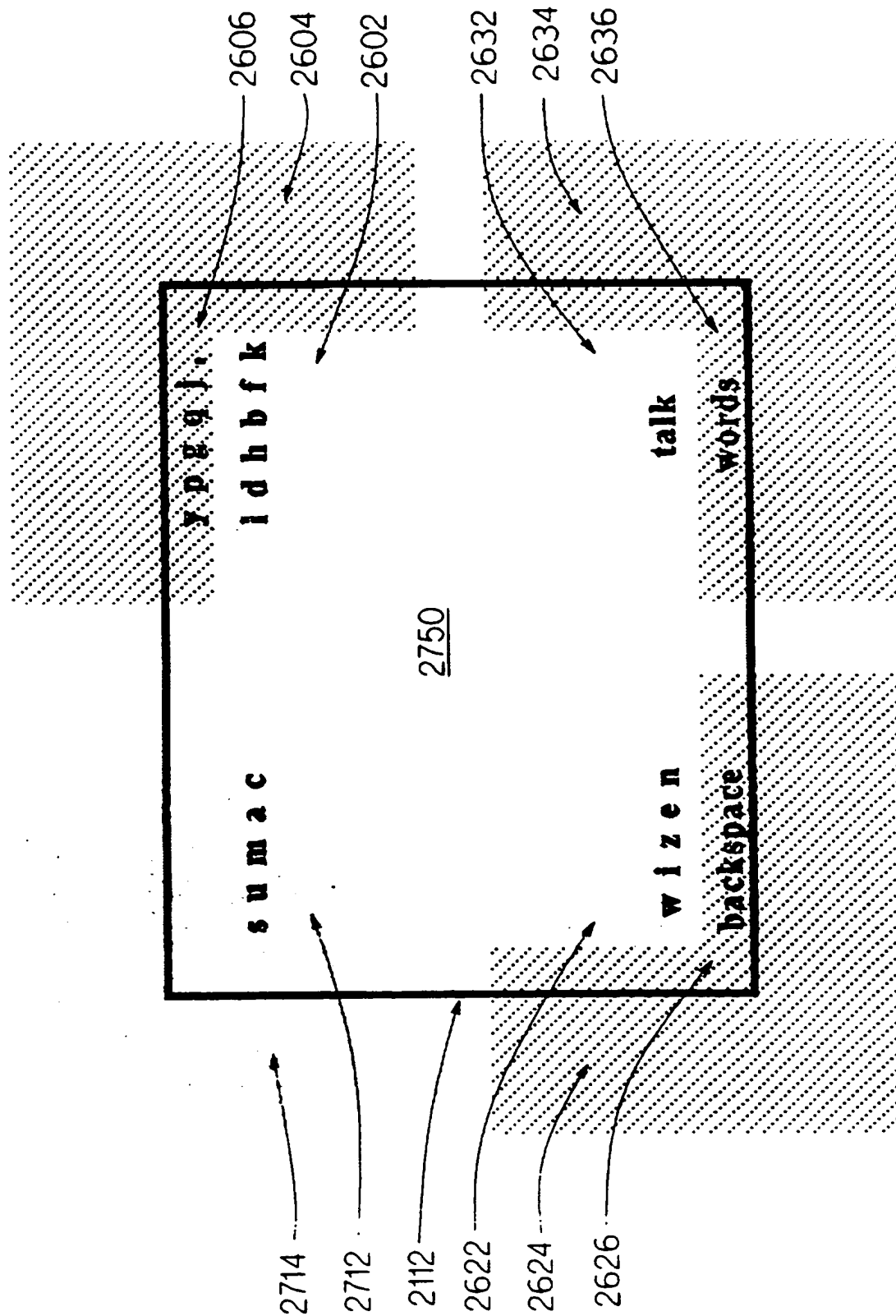
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FIG. 44



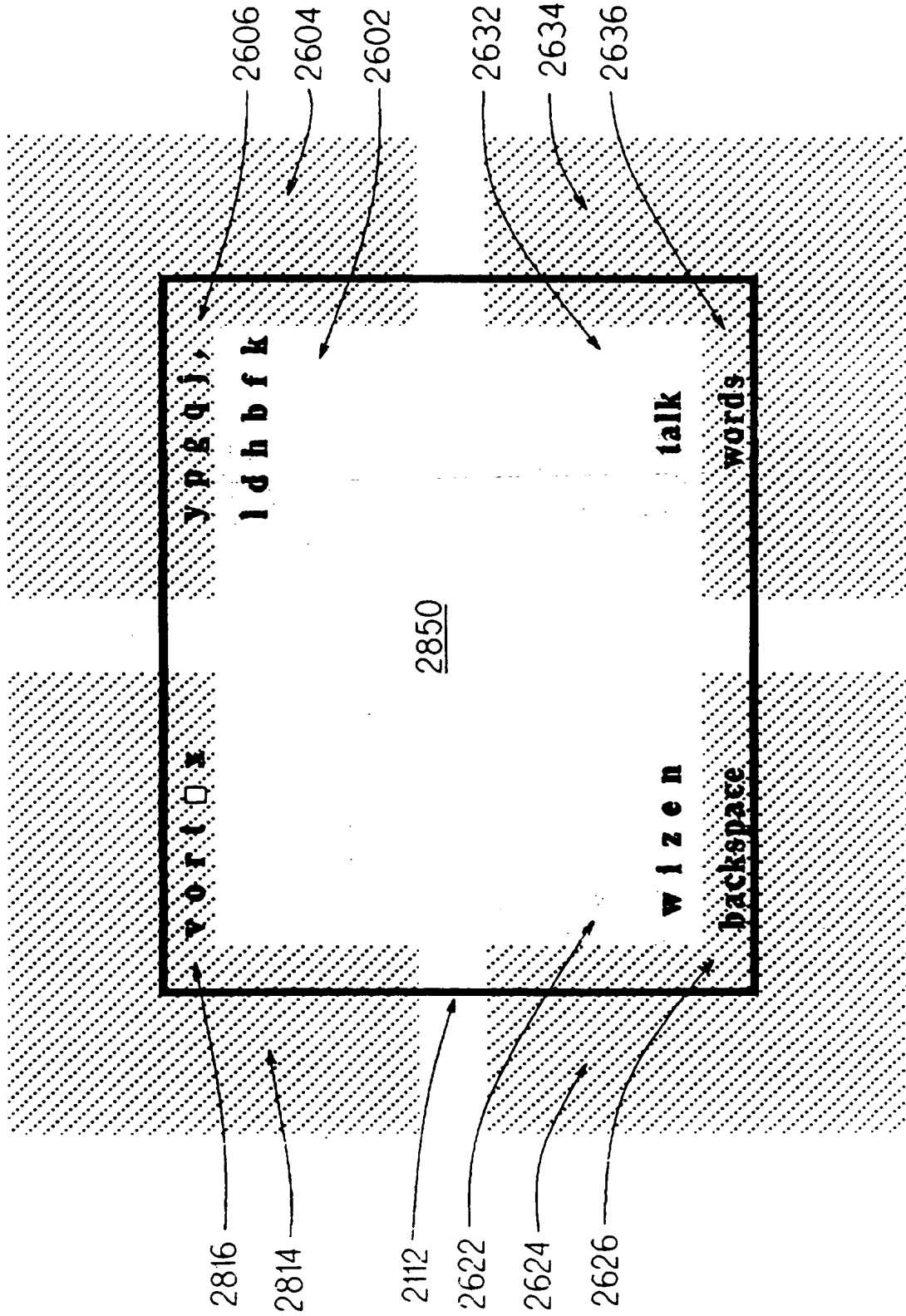
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FIG. 45



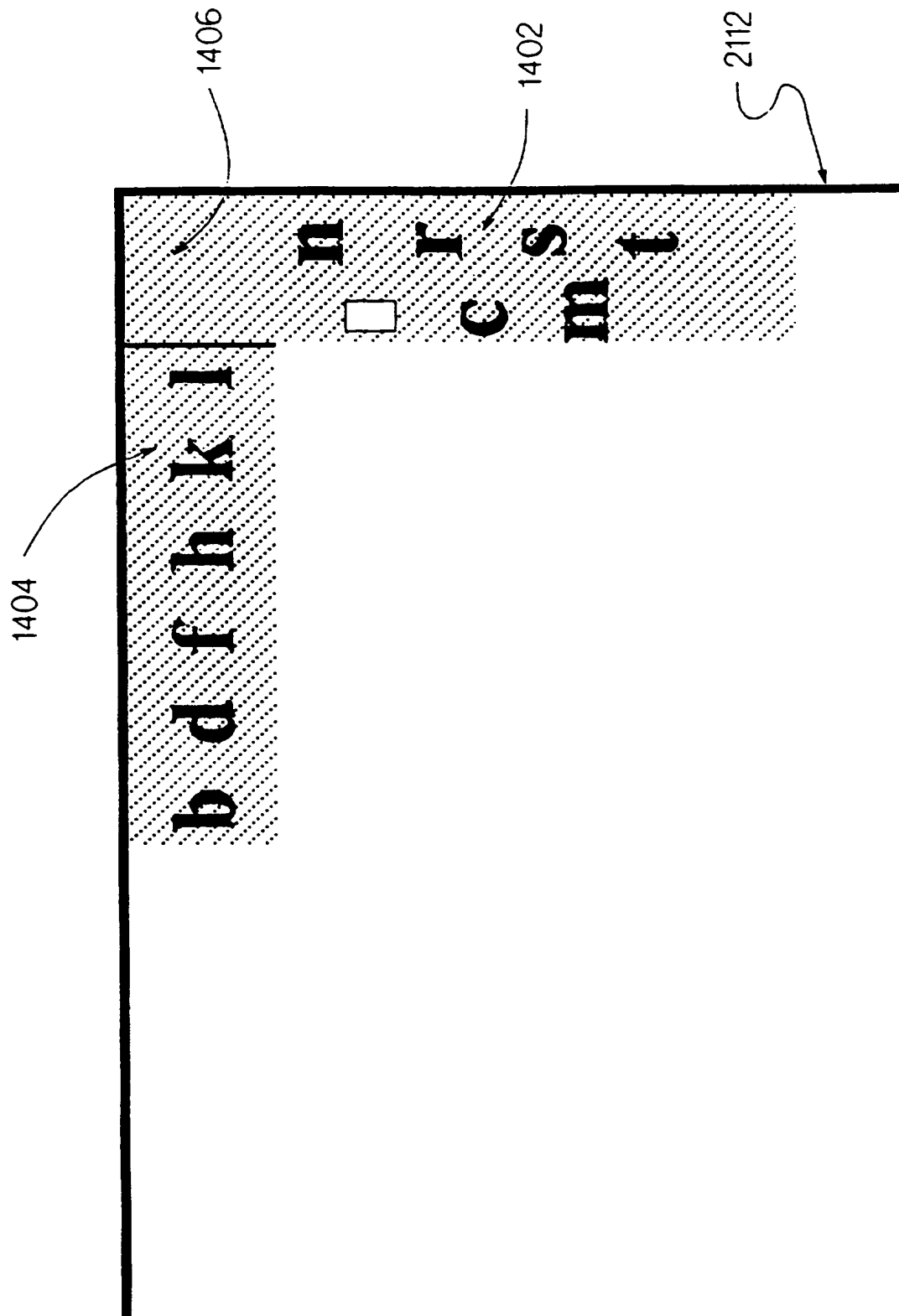
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FIG. 46



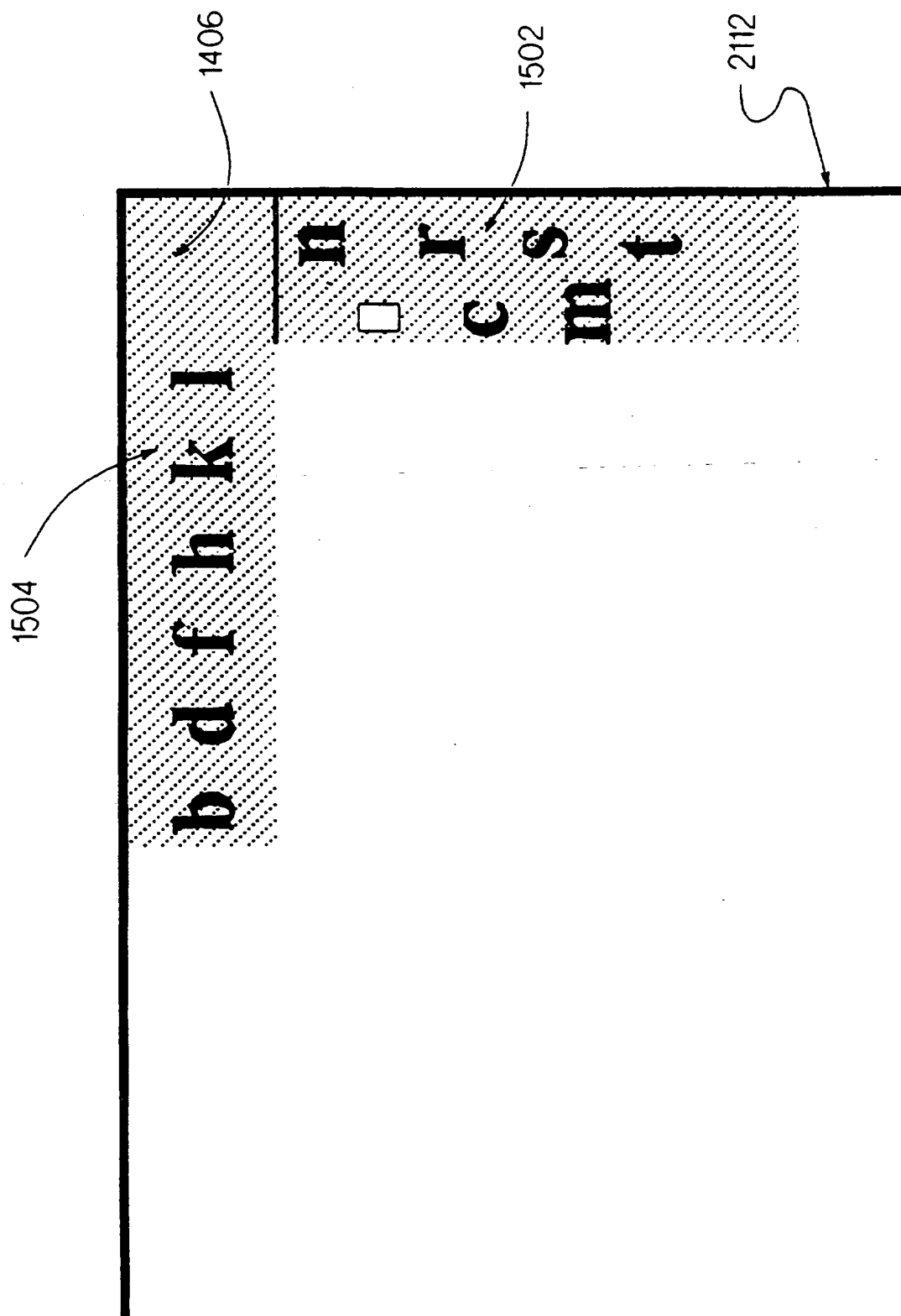
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FIG. 47



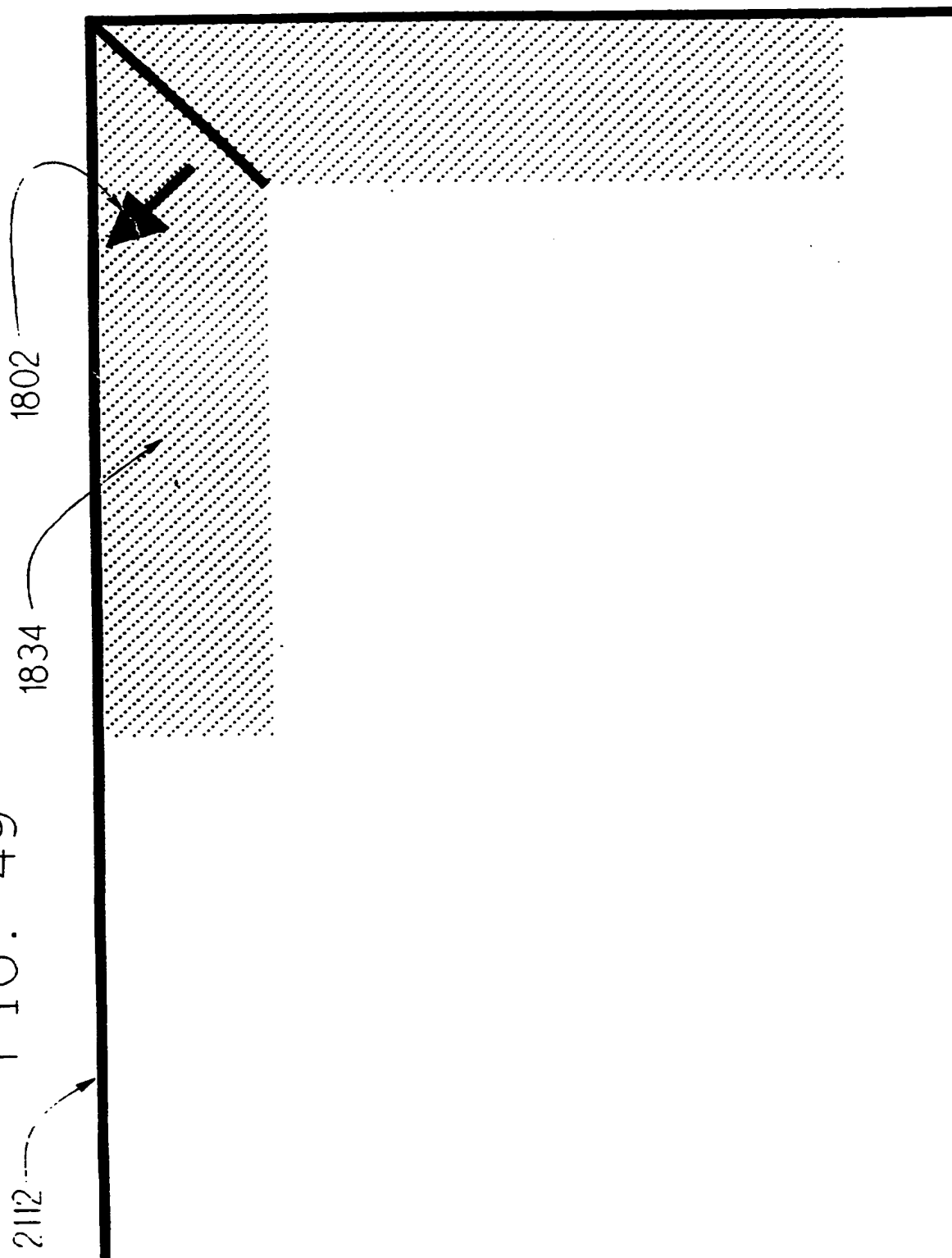
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FIG. 48



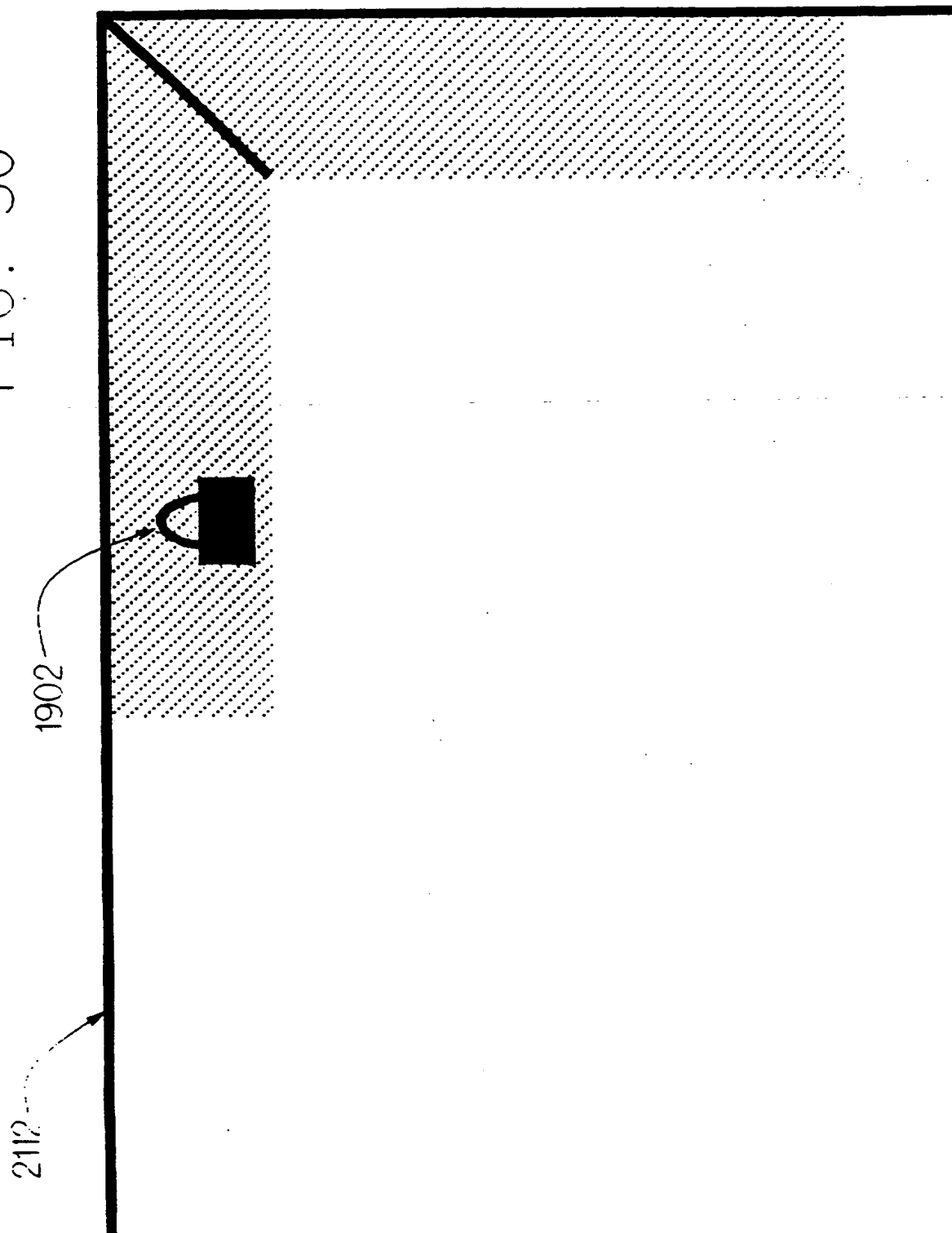
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FIG. 49



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FIG. 50



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FIG. 51.

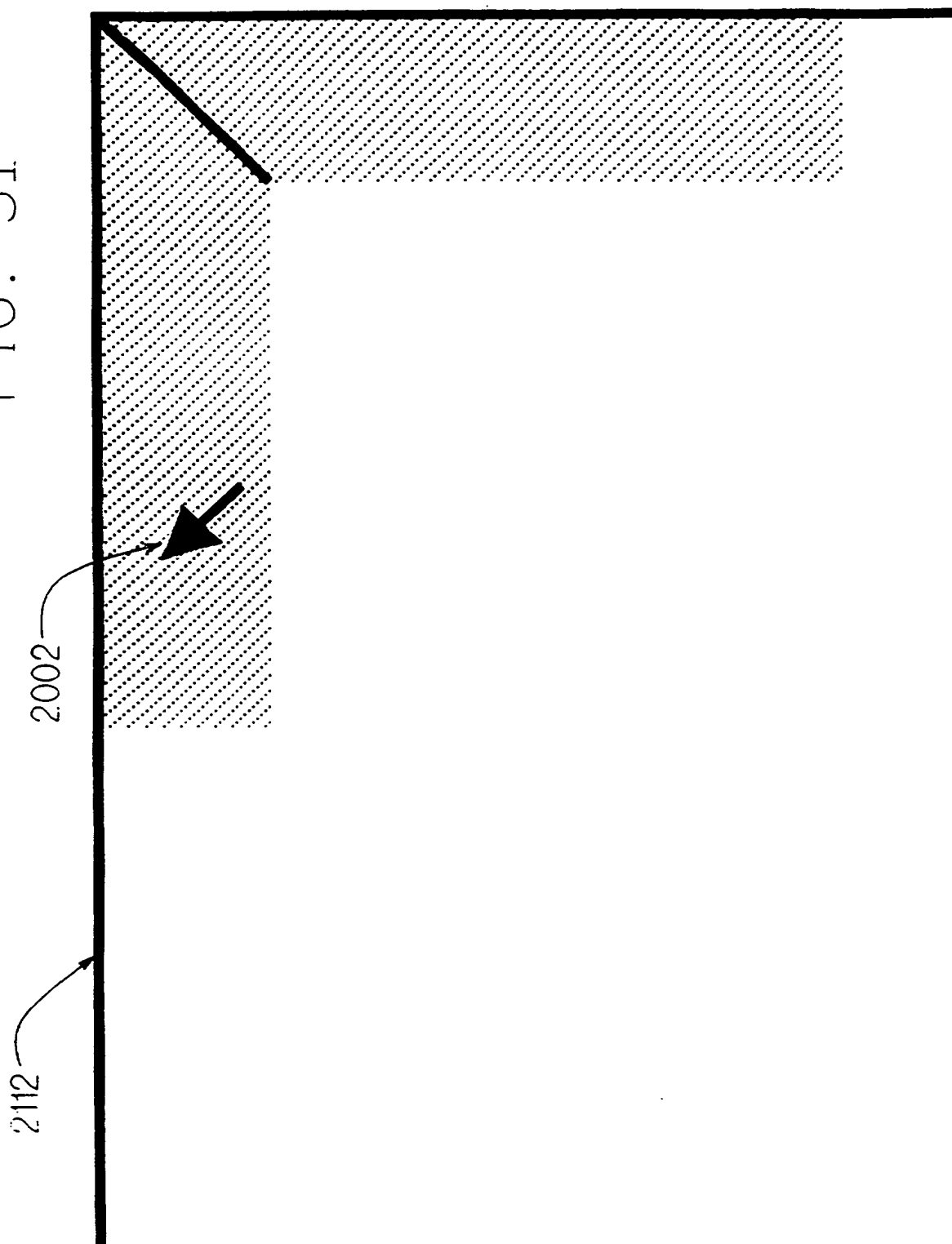


FIG. 52

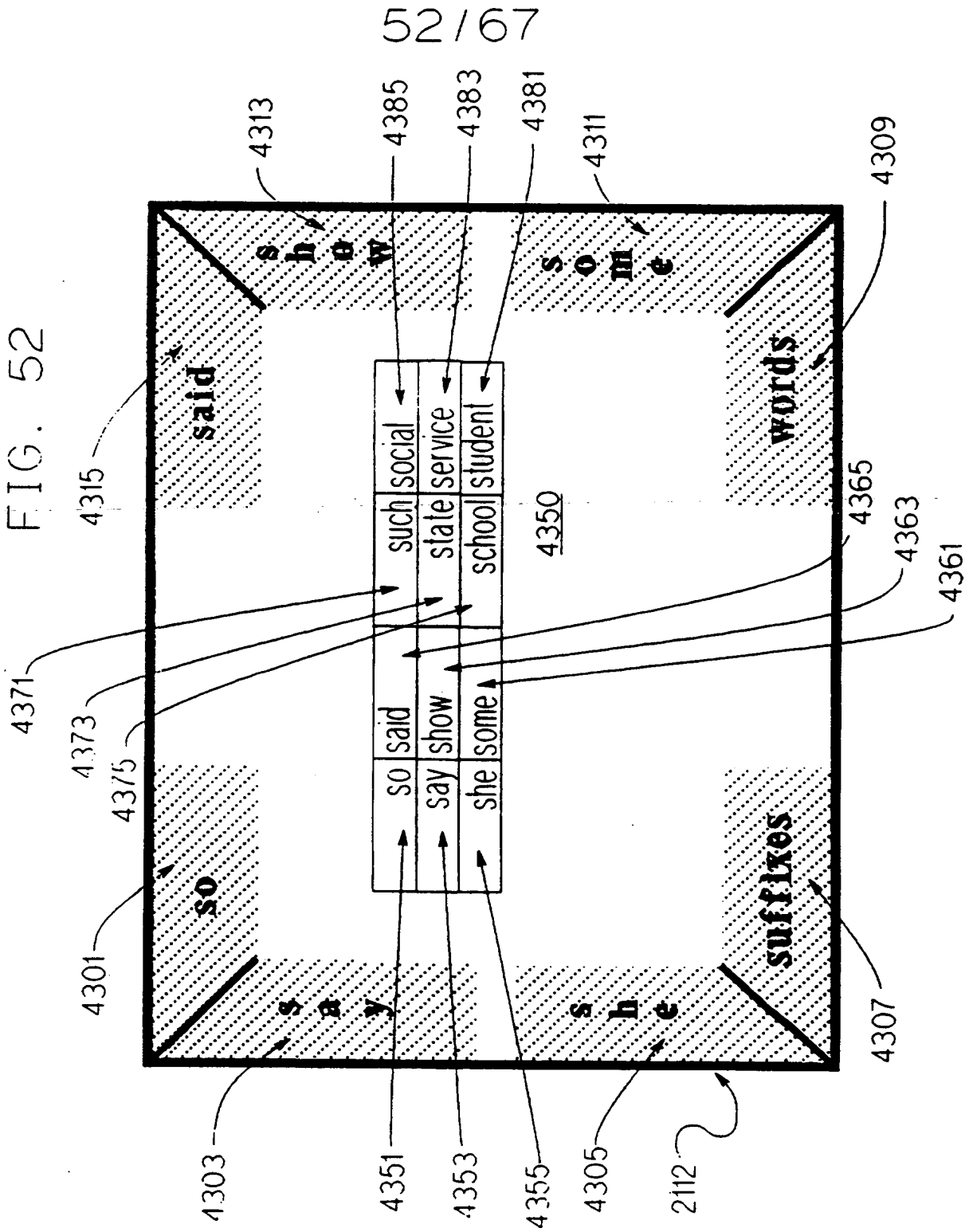
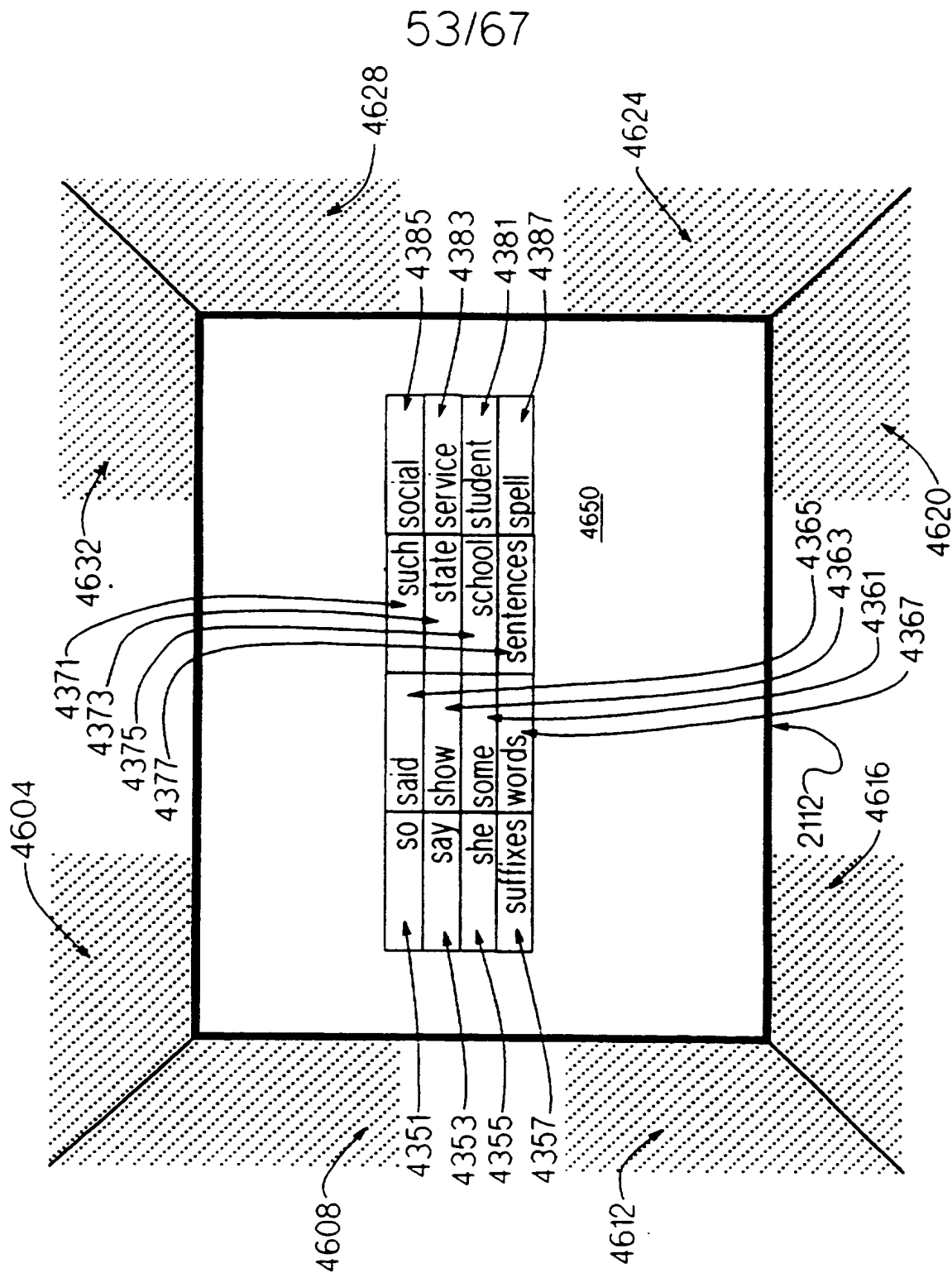
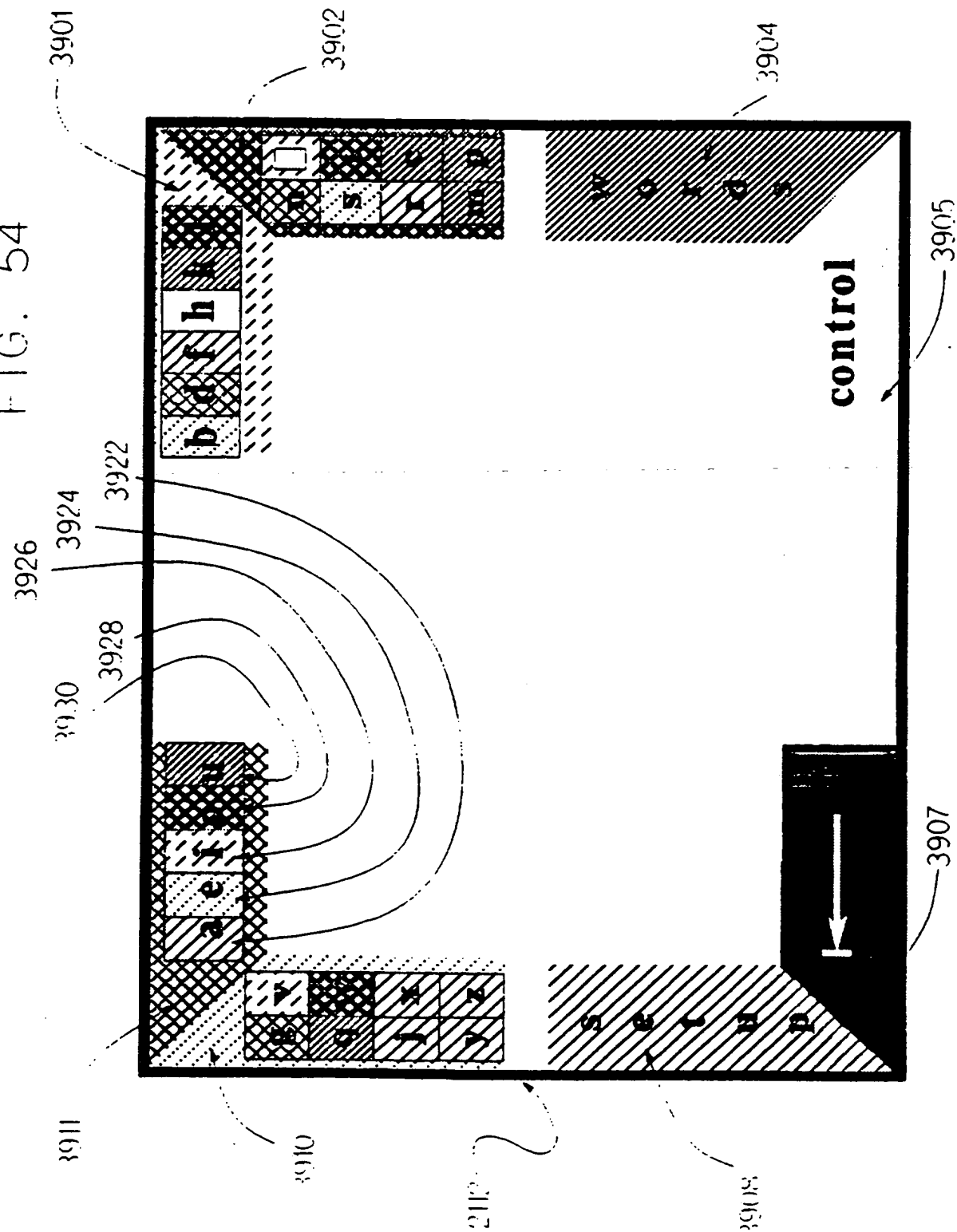


FIG. 53



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FIG. 54



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FIG. 55

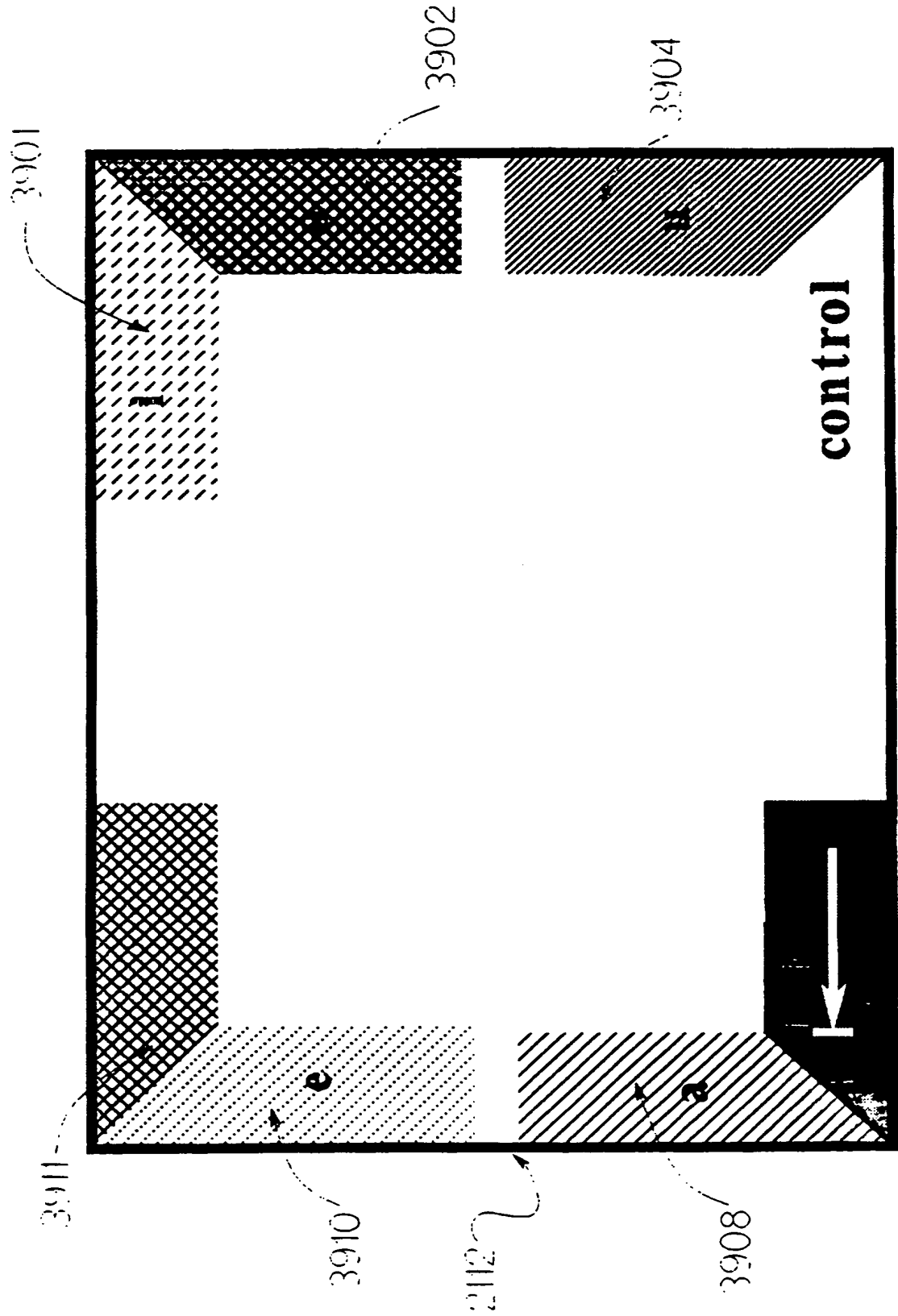


FIG. 56

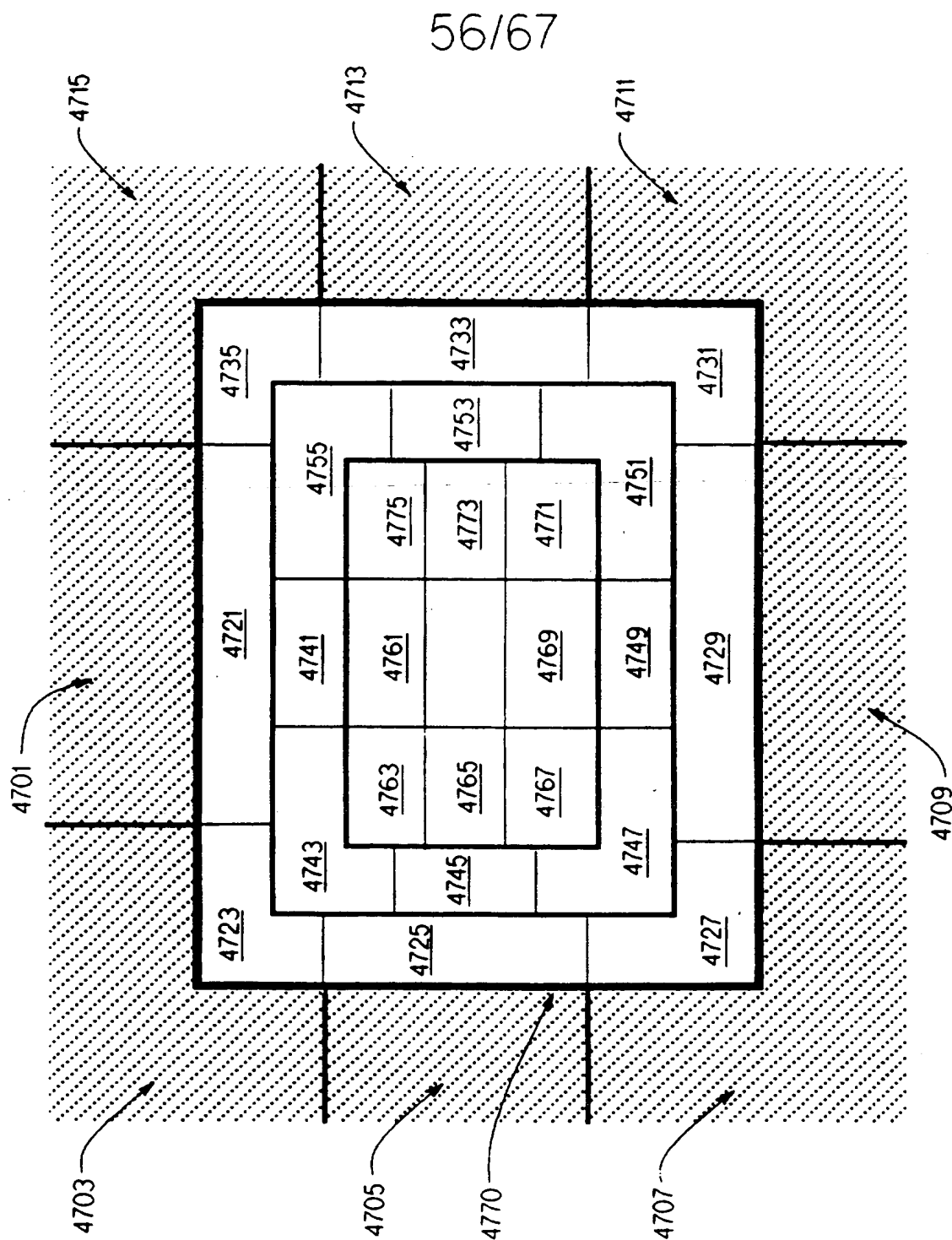
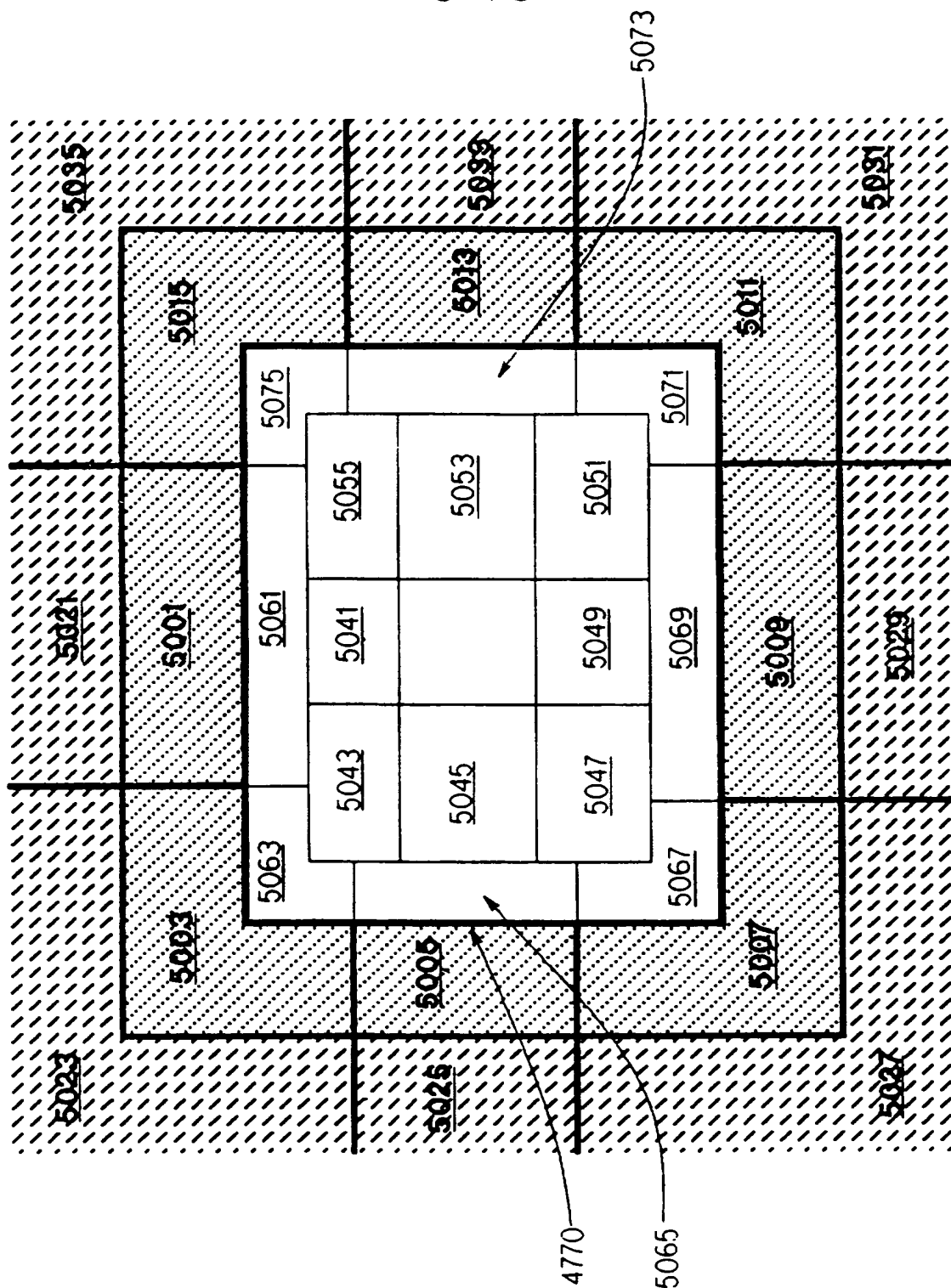
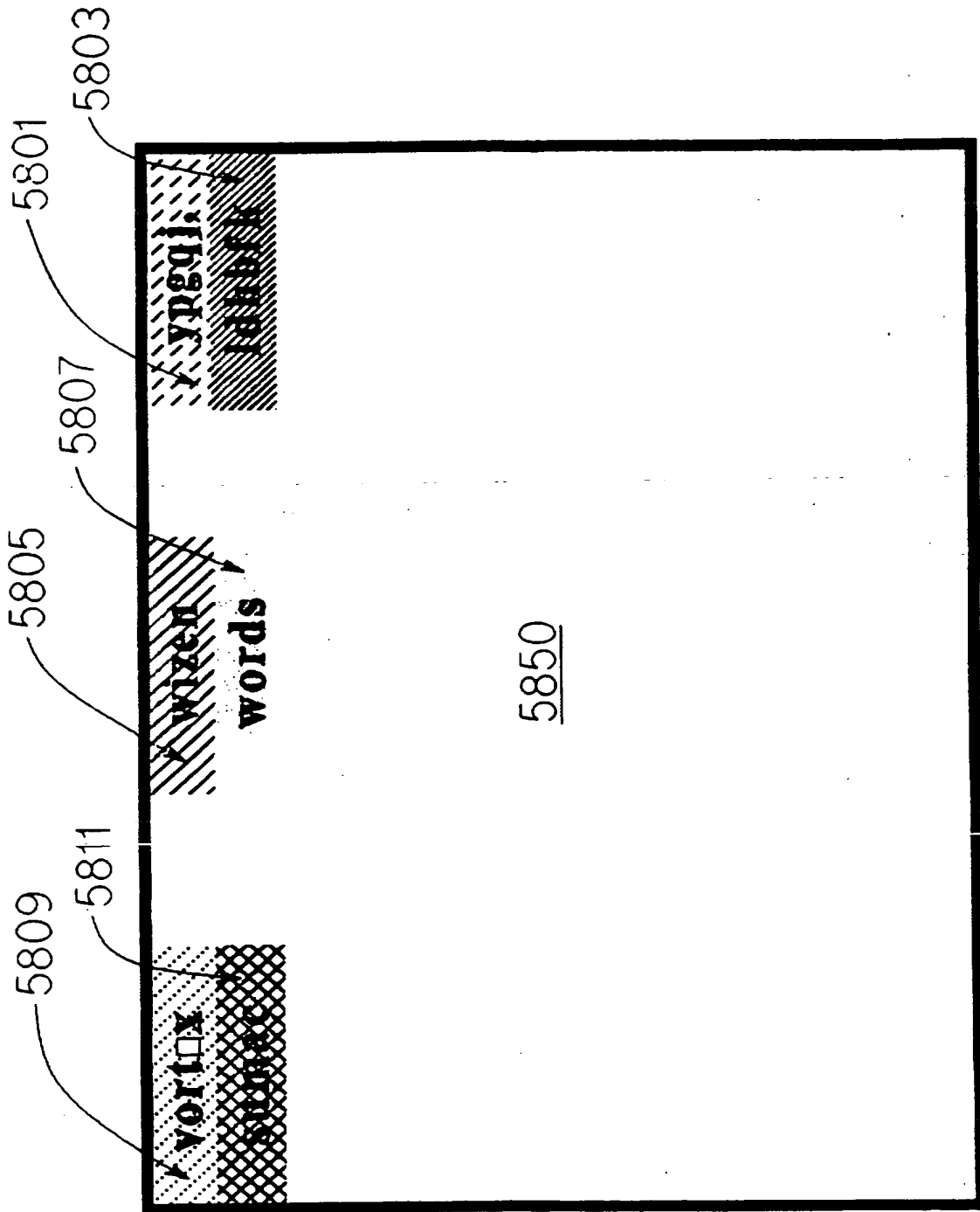


FIG. 57.



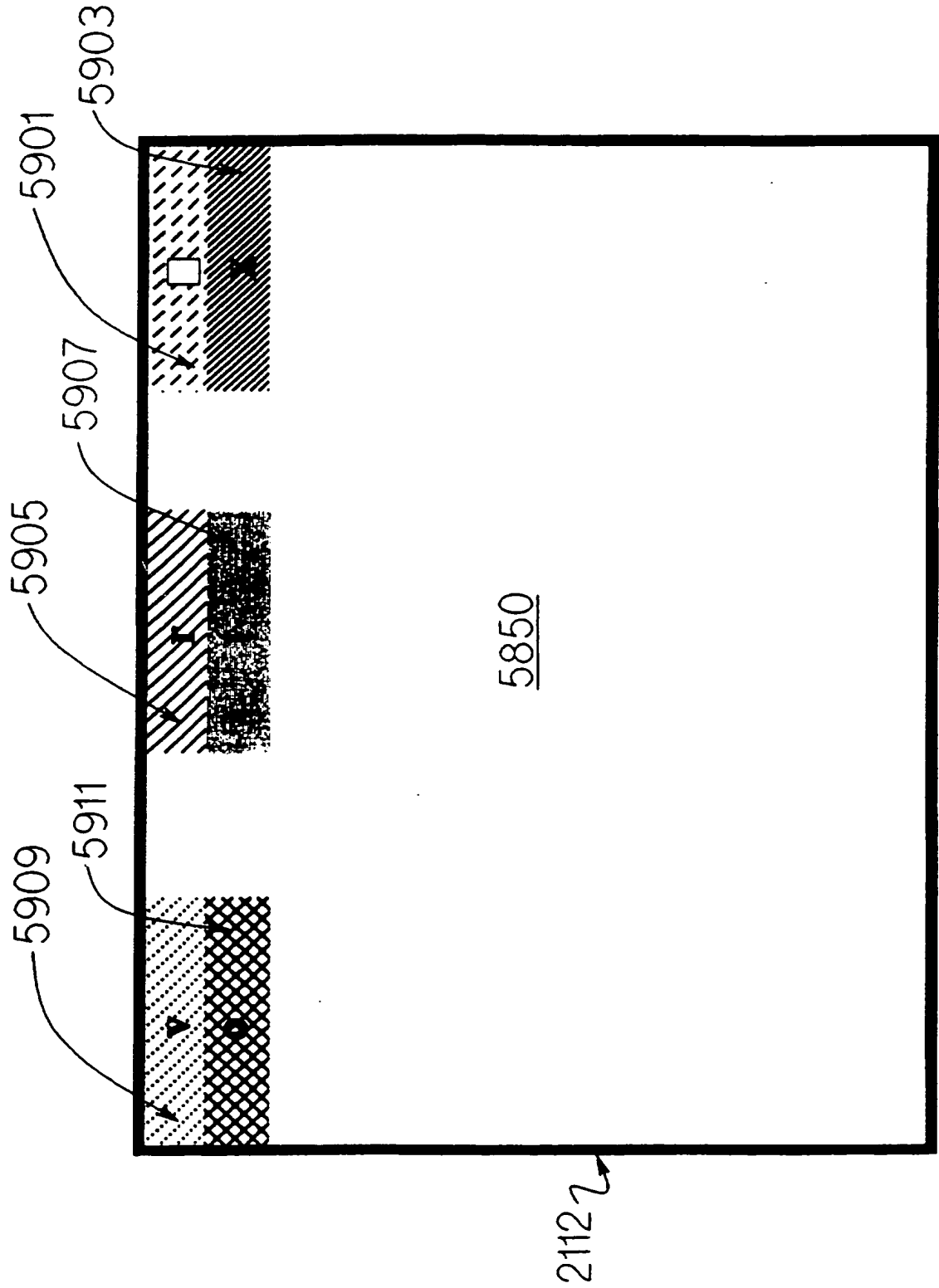
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FIG. 58



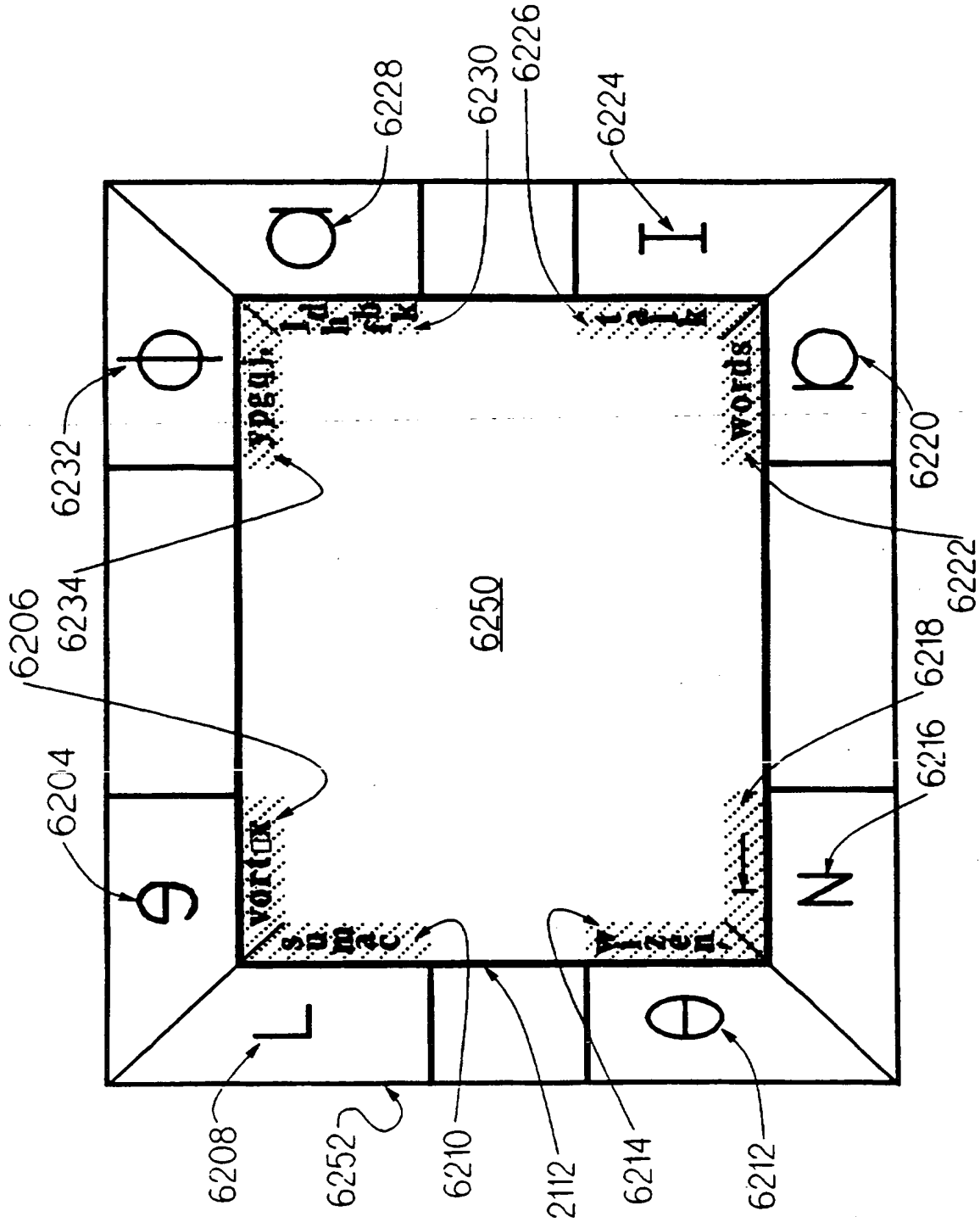
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FIG. 59



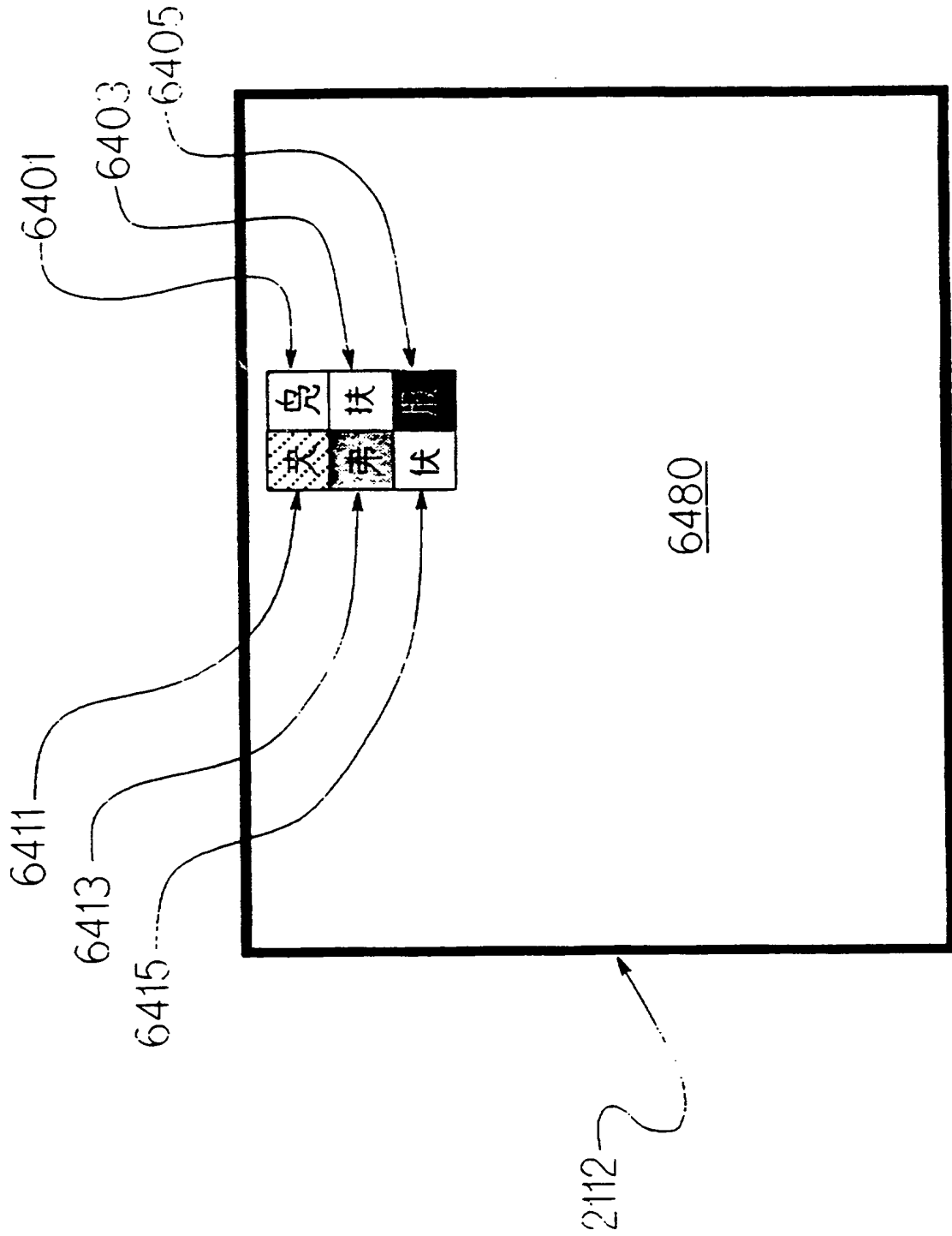
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FIG. 60



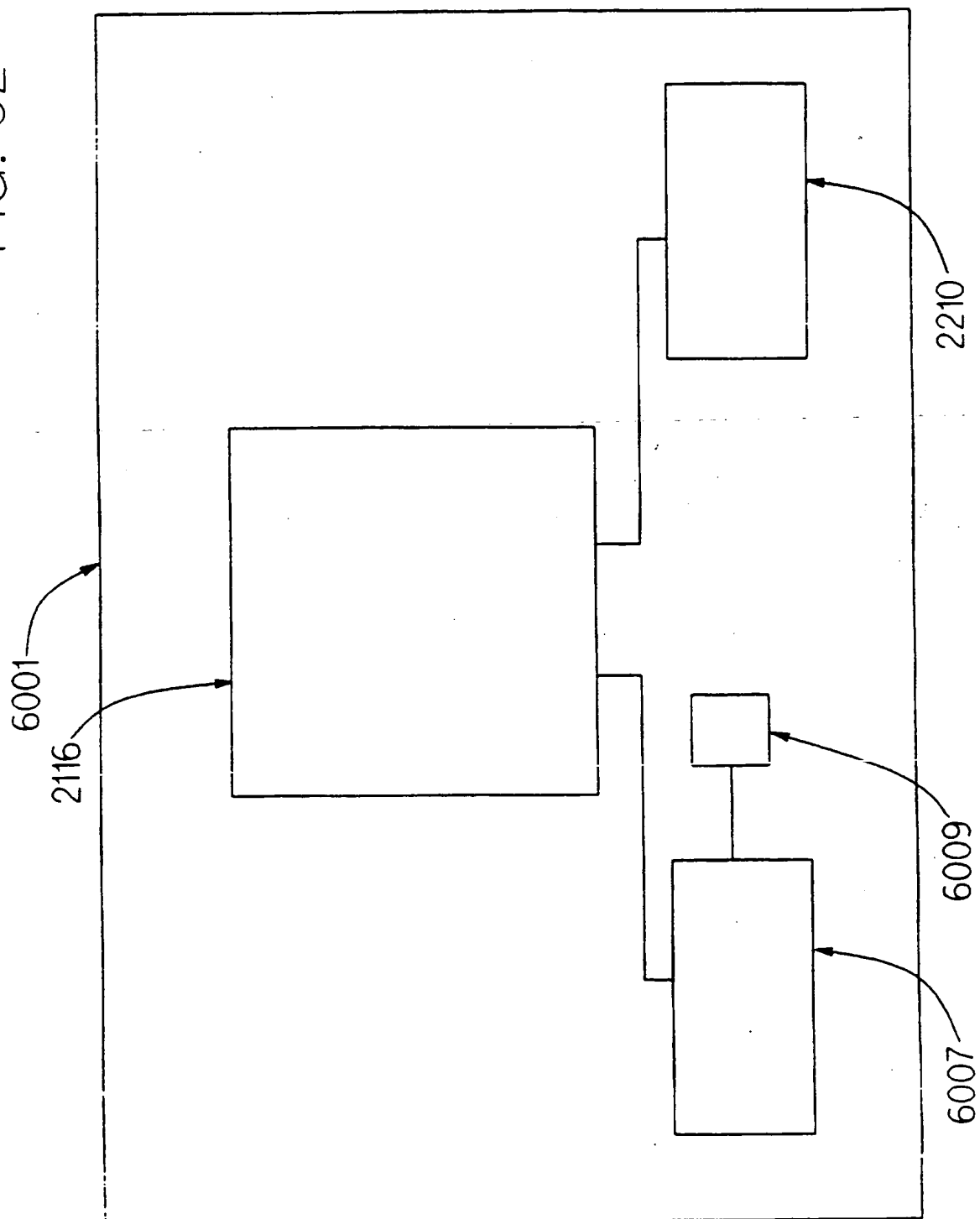
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FIG. 61

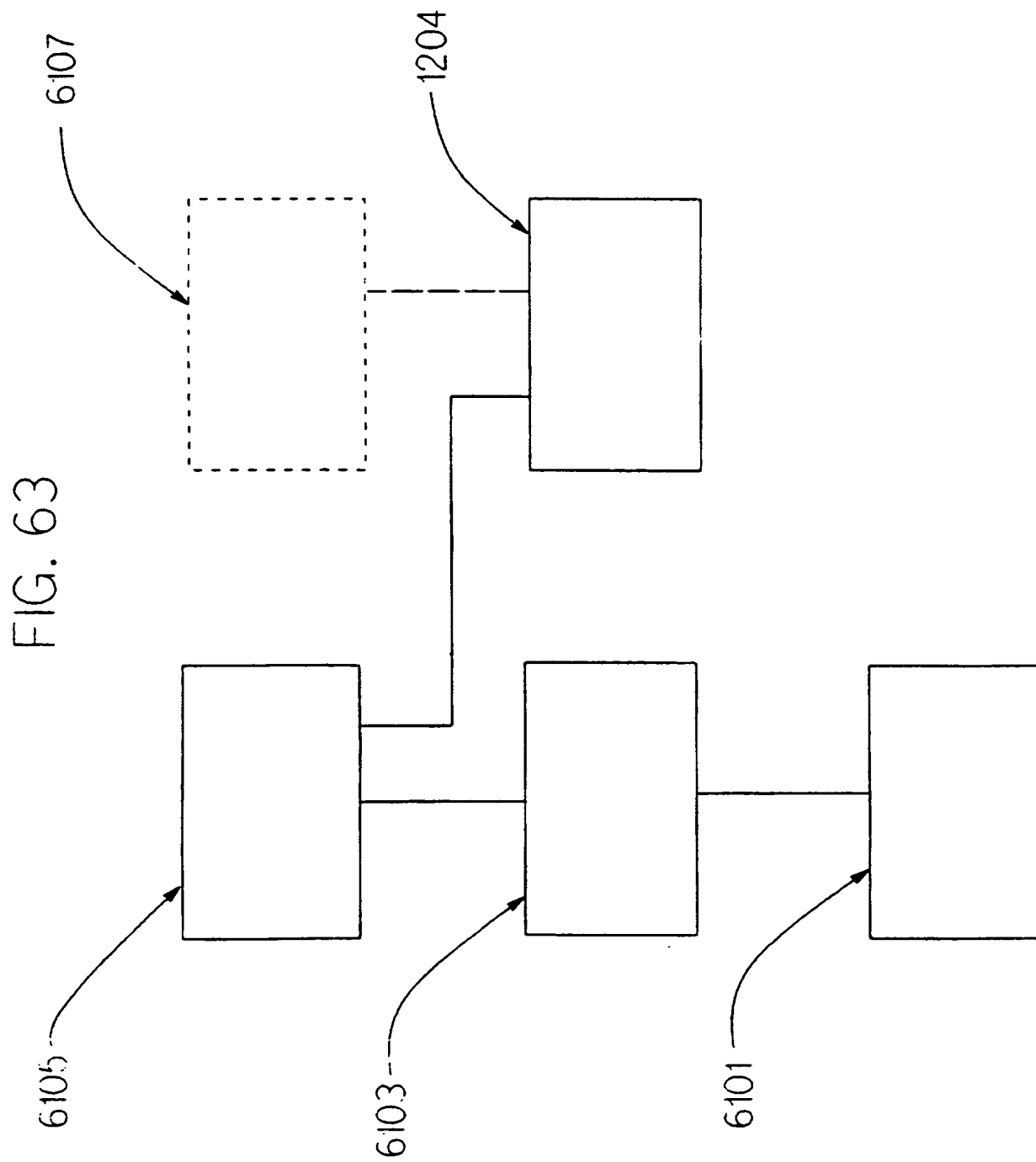


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FIG. 62

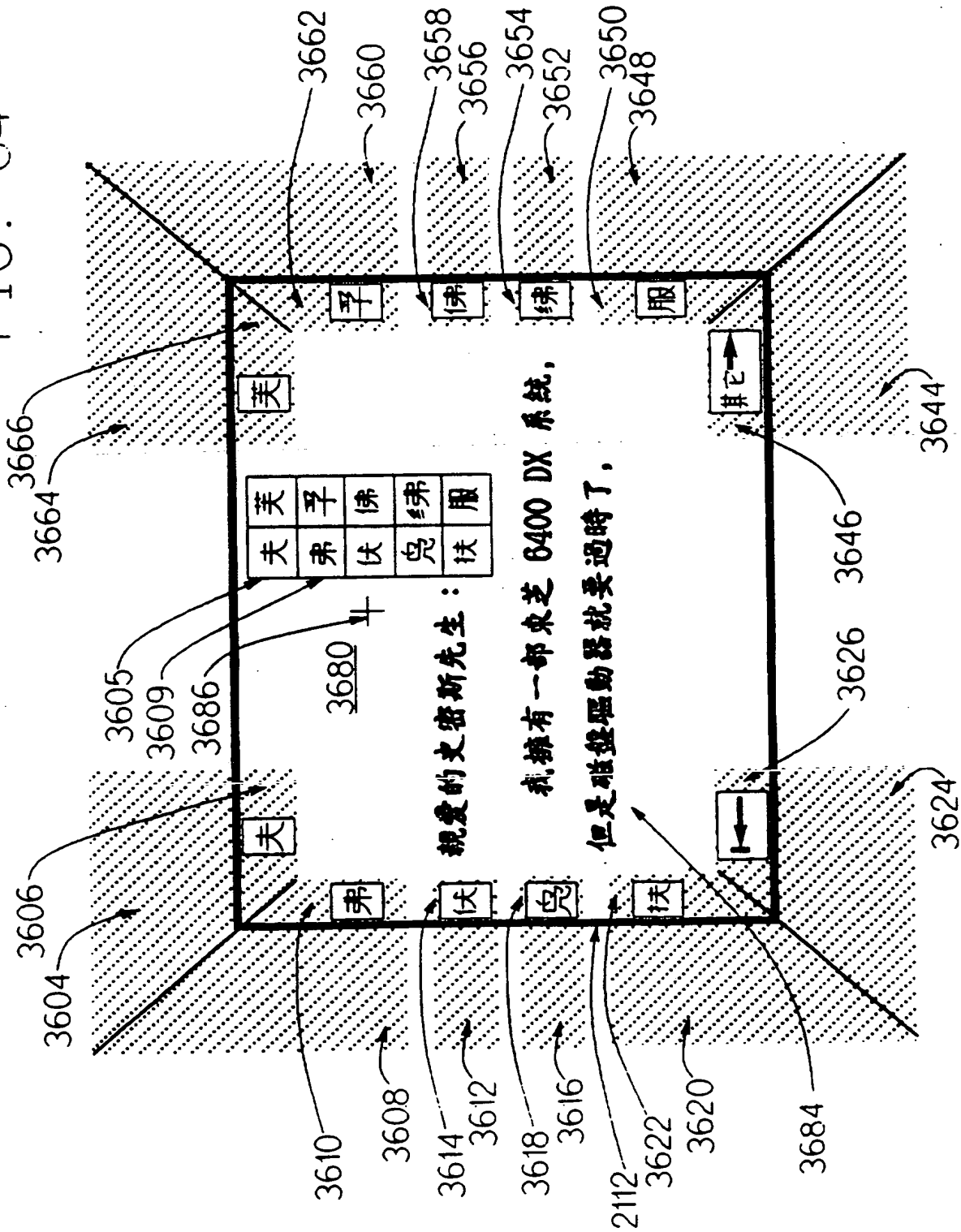


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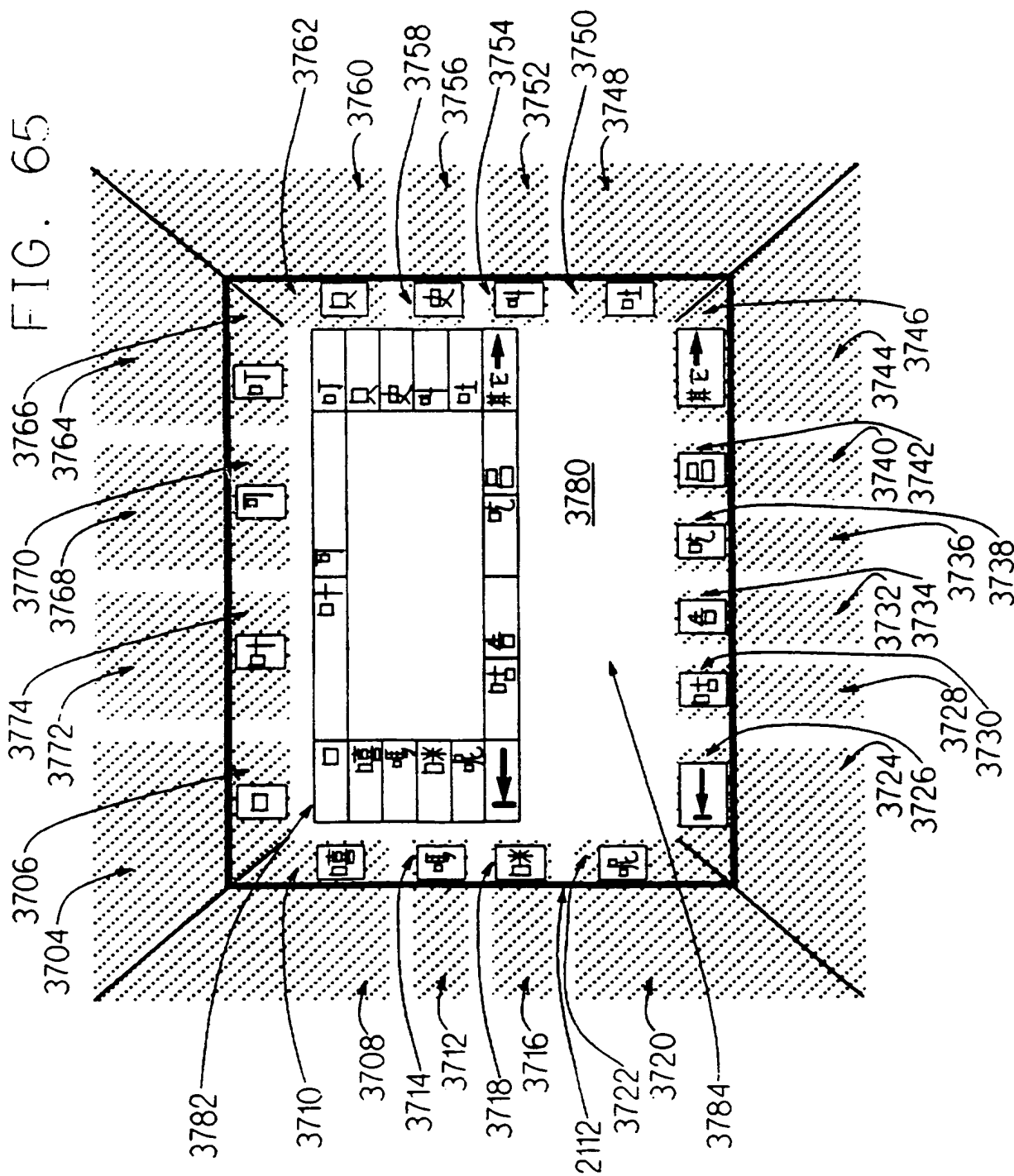
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FIG. 64



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FIG. 65



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FIG. 66

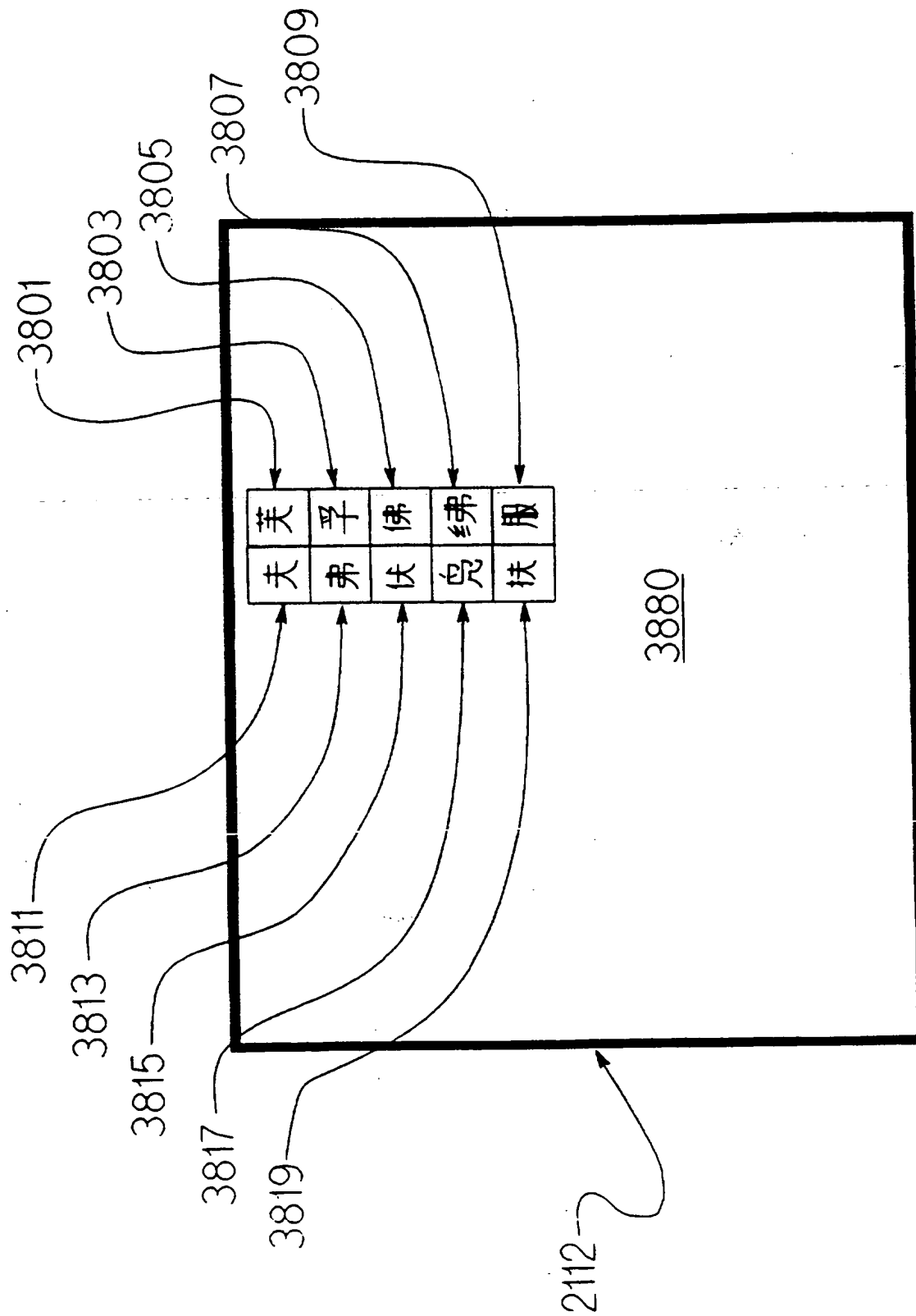
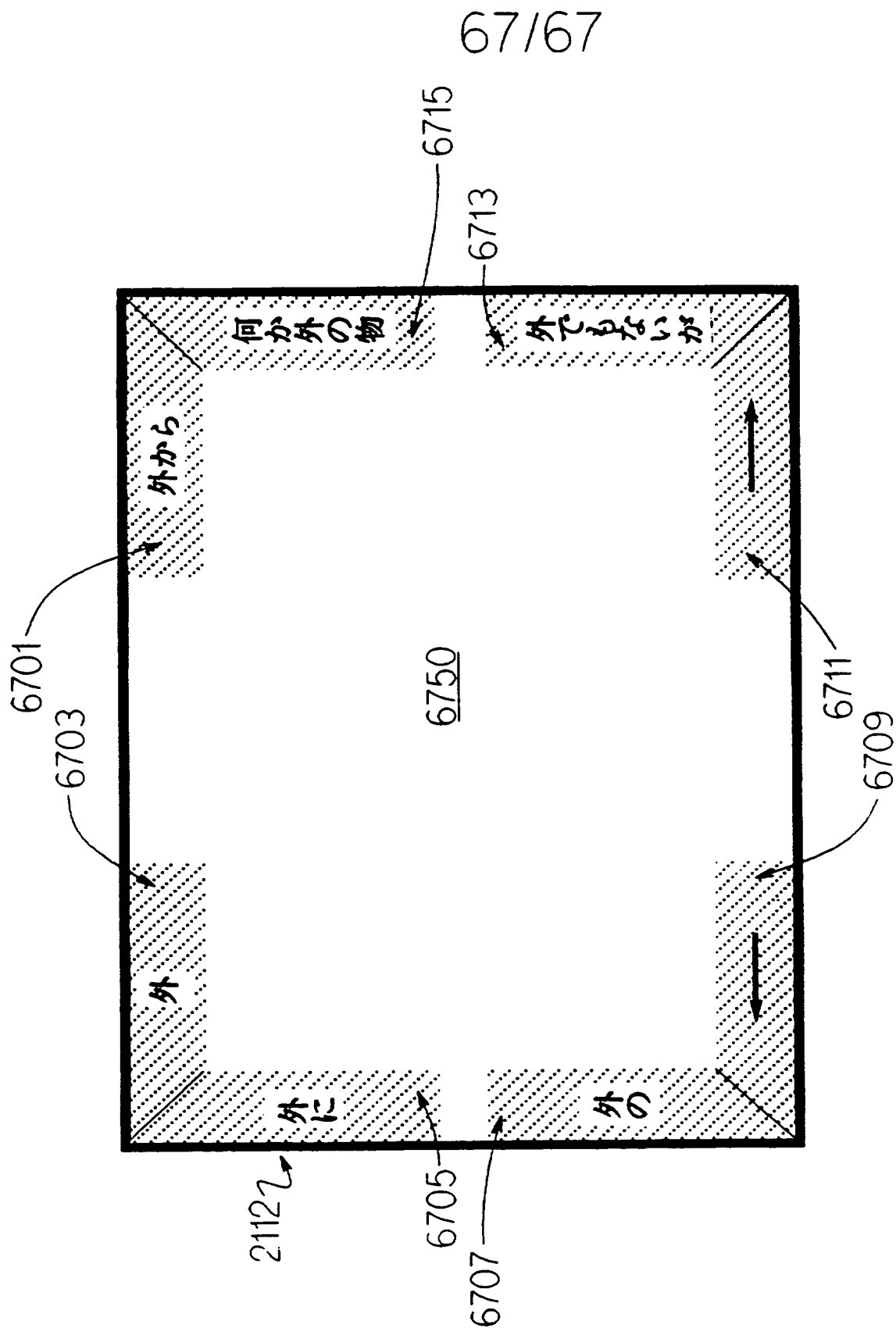


FIG. 67



INTERNATIONAL SEARCH REPORT

National Application No

T/US 95/03591

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G06F3/00 G06F3/033 G06F3/023 G09B21/00 A61F4/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G06F G09B A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	DE,U,93 00 231 (HASABI I.) 19 August 1993 see page 1, line 1 - page 6, line 2	34 43,44
X	--- PATENT ABSTRACTS OF JAPAN vol. 018 no. 460 (P-1793) ,26 August 1994 & JP,A,06 149534 (TOSHIBA CORP) 27 May 1994, see abstract	34
Y A	--- EP,A,0 324 306 (IBM) 19 July 1989 see the whole document	31 1,10,19, 21,22
	--- -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

* & * document member of the same patent family

Date of the actual completion of the international search

12 March 1996

Date of mailing of the international search report

28.03.96

Name and mailing address of the ISA

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Fax: (+ 31-70) 340-3016

Authorized officer

Bailas, A

INTERNATIONAL SEARCH REPORT

Patent Application No.

PCT/US 95/03591

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US,A,4 109 145 (GRAF CARL P) 22 August 1978 see column 2, line 39 - line 59 see column 3, line 13 - column 8, line 30	31
A	---	1,3,6,7, 19-25, 30,130, 164,165, 228,322
A	GB,A,2 173 023 (INTECH SYSTEMS INC) 1 October 1986 see page 2, line 52 - page 4, line 9 ---	1,2,5,8, 14,17,19
A	COMPUTER, vol. 26, no. 7, LOS ALAMITOS US, pages 65-66, XP 000376643 JACOB R. J. K. ET AL 'What you look is what you get' see page 65, left column, line 1 - middle column, line 12 see page 66, middle column, line 6 - line 63 ---	1,4,15, 19,20
A	IBM TECHNICAL DISCLOSURE BULLETIN, vol. 32, no. 8b, NEW YORK US, pages 231-232, XP 000082441 'PRE - SELECTION HIGHLIGHTING' see the whole document ---	28,29,32
A	IBM TECHNICAL DISCLOSURE BULLETIN, vol. 33, no. 10A, 1 March 1991 page 378/379 XP 000110092 'DISCRETE AND CONTINUOUS CONTROL USING STABLE SPEECH SOUNDS' see the whole document ---	41,43, 44,46
A	WO,A,86 03863 (UNIV ADELAIDE ;DOWNING ANDREW RICHARD (AU)) 3 July 1986 see page 1, line 1 - page 3, line 3 see page 4, line 15 - line 22 see page 5, line 6 - line 33 see page 8, line 6 - page 9, line 11 ---	130
A	IEE PROCEEDINGS A PHYSICAL SCIENCE, MEASUREMENT & INSTRUMENTATION, MANAGEMENT & EDUCATION., vol. 134, no. 4, April 1987 STEVENAGE GB, pages 328-330, YAMADA M. ET AL 'Eye word processor (EWP) and peripheral controller for the ALS patient' see page 329, right column, line 1 - line 21; figure 5 ---	52,57, 125,130
	---	-/--

INTERNATIONAL SEARCH REPORT

International Application No

/US 95/03591

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US,A,4 788 649 (SHEA F WILLIAM ET AL) 29 November 1988</p> <p>see column 19, line 1 - line 25 -----</p>	<p>125,130, 164,165, 228,322</p>

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 95/03591

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

SEE ANNEXED SHEET

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

1-32, 33-57, 125, 130, 164-165, 228, 252, 289, 322

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

INVITATION TO PAY ADDITIONAL FEES

International application No.
PCT/US 95/03591

1. Claims 1-32: Method of selecting a sequence of graphic symbols (ideographs).
2. Claims 33-57, 125, 130, 164-165, 228, 252, 289, 322: Speech synthesizer and menu selection by sound.
3. Claims 58-121, 128, 154-155, 173-174, 180-221, 224-227, 233-236, 238-251, 253, 292-321, 323-325: Menu selection methods.
4. Claims 122-124, 131, 159-160, 163, 166, 175-176, 222, 281-283, 290-291: Character and word data entry method.
5. Claims 132-153, 177-179: Indicating cursor dwell time at a specified position.
6. Claims 167-172, 275-280: Ordering system.
7. Claims 254-174: Cursor alignment/movement method.
8. Claims 230-231, 237: Method for measuring disabled person's ability to move a limb.
9. Claims 126-127, 156-158, 229-230: Cursor controller.

The special technical feature of the first invention is:
A method of selecting a sequence of graphic symbols (ideographs).

According to Rule 13 PCT non-unity a priori is detected for inventions 2-9 which deal with the following:

2. Speech synthesizer and menu selection by sound.
3. Menu selection methods.
4. Character and word data entry method.
5. Indicating cursor dwell time at a specified position.
6. Ordering system.
7. Curser alignment/movement method.
8. Method to measure disabled person's ability to move a limb.
9. Cursor controller.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

US 95/03591

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-U-9300231	19-08-93	NONE	
EP-A-0324306	19-07-89	US-H- H716 JP-A- 1136227	05-12-89 29-05-89
US-A-4109145	22-08-78	NONE	
GB-A-2173023	01-10-86	US-A- 4698758 CA-A- 1235818 JP-A- 61234465 NL-A- 8502825	06-10-87 26-04-88 18-10-86 16-10-86
WO-A-8603863	03-07-86	AU-B- 5237786 GB-A- 2179147	22-07-86 25-02-87
US-A-4788649	29-11-88	NONE	